A HISTORY OF GENETICS

AT

THE OHIO STATE UNIVERSITY

by

Elton F. Paddock

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Introduction

There is evidence in the heiroglyphics on the tombs of the pharoahs in Egypt that man already then was sufficiently conscious of the phenomenon of heredity that pollination control was being practised on the date palm.* But not until 1865 and the publication in Europe of the now famous paper by the cleric-botanist Gregor Mendel is there evidence that anyone had yet grasped the fundamentals that cause the phenomenon of heredity. The significance of his paper was unappreciated by Mendel's contemporaries and lay in obscurity for 40 years. In 1900 the paper was simultaneously and independently discovered by three other European botanists. The Ohio State University in 1900 was already a 30 year old institution whose enrollment had slowly but steadily increased to approximately 1400 students. It is recorded that already in 1902 there was a stirring of interest in genetics at The Ohio State University. Two scientists of the United States Bureau of Plant Industry gave

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*Rodgers, A. D. 1949
Liberty Hyde Bailey: a story of American plant sciences
Princeton University Press, Princeton, New Jersey. (See page 266)

lectures about Mendel's paper before the Graduate School of Agriculture in our College of Agriculture. They were H. J. Webber who was then in charge of the bureau's Laboratory of Plant Breeding, and W. J. Spillman who was then the bureau's Agrostologist.

Course Beginnings

The first course of instruction in any department at the Ohio State University to have the word "genetics" in its title appeared in the catalogue for the 1911-12 academic year. The new course was Botany 121, Plant Genetics, and it was taught by Professor J. H. Schaffner until it was terminated by his going on research duty in 1927-28. He had joined the staff in 1905 and introduced Botany 35, Evolution of Plants, in 1908. It could not have happened before 1909 in any college or university, for that was the year the words "gene" and "genetics" were coined by a European botanist. Also in 1909, W. M. Barrows joined the staff in Zoology. The catalogue for 1909-10 carried his new course, Zoology 129-130, Quantitative Studies in Variation: Heredity and Animal Behavior. It was the first course to have the word "heredity" in its title. This title was shortened in 1914 to "Quantitative Studies in Variation and Heredity", and changed in 1917 to "Advanced Studies in Animal Heredity". At the same time in 1917 a new course, Zoology 115 was introduced entitled, "General Principles of Heredity." It is 1917 which present day members of the Zoology

staff who were students of Barrows recalled when I quizzed them about the beginnings of genetics at The Ohio State University. If courses with "breeding" and/or "improvement" in their title may be construed as dealing with genetics, the beginning can be traced back as far as 1905-06.

Course Ramifications

The principal principles of genetics are equally pertinent to animals (including man) and plants, to wild species and domesticated. Consequently several biological departments distributed in more than one college offer and/or have offered courses in the subject.

Agronomy 26, Improvement of Farm Crops, was first listed in the catalogue for 1905-06. Its name changed 3 times and its number twice (while the name of the department changed twice) before it was dropped in 1931. In 1935, Agronomy 607, Field Crop Breeding, was introduced as an alternate years course, was changed to No. 614 in 1956-57, and in 1967-68 to No. 530 under which number it is still going today. Along the way there were also Agronomy 29, 117-118, 201-202, 405, and 801 all of which had "breeding" and/or "improvement" in their titles, but all these courses terminated in or before 1931 when the department name changed back to "Agronomy" from "Farm Crops." No. 807, Techniques of Experimental Design, with Zoology 630 as a prerequisite, was introduced in the catalogue for 1948-49. It was offered every year except 1954-55 (which may have been a typographical error of omission) until 1967-68 when its

number was changed to 887. No. 810, Advanced Field Crop Breeding, was introduced one year after No. 807 as an alternate years course. Its number was changed to 814 in 1956-57, and to 830 in 1967-68 under which it appears in the centennial catalogue.

The Department of Anatomy has had No. 615, Human Developmental Anatomy, a four credit hour course since before 1960. In 1965-66, "and Genetics" was added to the title. In 1967-68 it was split into two two-credit-hour courses, No. 615 was held as prerequisite to No. 617. In 1963-64 a new four credit hour course, No. 815, Human Morphogenesis, came in; also taught by Professor Weston. As in the case of No. 615, "and genetics" was added to its title in 1965-66. In the centennial catalogue, Item 10, Principles of Human Cytogenetics, appears for the first time under No. 793, Individual Studies in Anatomy, to be taught by Assistant Professor Hayes who is new to the staff of that department.

The first listing by the Animal Husbandry Department of courses that can be construed as genetics also occurred in 1905-06. They were courses No. 5 and No. 6, taught by Professor Gay, entitled "Principles of Breeding", and terminated in 1916-17. Two new courses were begun the following year: No. 157, Animal Genetics, and No. 161, Herd Book and Pedigree Study. After its second year the title of No. 157 was changed and Barrows' Zoology 115 (also new that year) was stated as a prerequisite. Three more years later (1921-22) its name was changed to "Breeding Livestock" after which it

was offered every year until 1931-32. No. 161 lasted only two years, but was resurrected in 1925 as No. 611, underwent three changes of name and one change of number before, in 1948-49, being merged with Dairy Husbandry 511. It is tantalizing as to why, from 1940-41 to said merger, the title contained the two words "Live Stock" instead of the one word "Livestock" which had been used in all other instances. In 1951-52 the Department of Animal Husbandry became the Department of Animal Science. Two years later No. 511 was dropped from catalogue listing. Also in 1951-52 the Department of Dairy Husbandry became the Department of Dairy Science and two years later changed its No. 511 to No. 420. From 1955-56 through 1961-62 there was a Note in the course list referring students interested in breeding and genetics to Dairy Science 520 and 620. After 1962 the two departments simply cross listed. In the present-day centennial year catalogue, Animal Science 420, Principles of Animal Improvement is again listed and cross-listed with the Departments of Dairy Science and Poultry Science.

Two courses, No. 133, Breeding of Animals, and No. 56, Breeding Livestock, were listed for two years each, respectively, in 1912-14 and 1915-17. No. 409, Breeding Livestock, was first listed in 1928-29. The next year its name was changed to "Animal Breeding" but three years later (in 1932-33) it was changed back to "Breeding Livestock" and kept so until the course terminated in 1947-48.

Anthropology 637, Living Races of Man, began sometime before 1955, with a prerequisite of "15 credit hours in Biological Sciences, including genetics" which it still carries. Its title was changed in 1964-65 to "Physical Variability of Modern Man," which it still has. Its number was changed to 452 in 1967-68 and again in the centennial catalogue to 535.

Dairy Husbandry began as a new department in 1946-47 with two courses: No. 409, Breeding Livestock, and No. 711, Advanced Livestock Breeding. Both are easily construed as genetics courses since they held Zoology 403 as a prerequisite. Two years later No. 409 was changed to No. 511, Livestock Breeding, and absorbed Animal Husbandry 711 of the same title. In 1953-54 it was changed to No. 420, to 520 in 1956-57, then back again to 420 in 1967-68, while in 1963-64 its title was cahnged to "Principles of Animal Improvement." No. 711, while being offered every year to the present, experienced a change in number, a change in title and number, and a change in number. It now appears cross listed with Animal Science and Poultry Science as No. 720, Genetics of Animal Populations. No. 420 is currently also cross listed the same way. A third course was introduced in 1948-49: No. 730, Animal Genetics for Veterinary Students, but lasted only 4 years. One year after the demise of No. 730, No. 620, Livestock Genetics, was started. After 1962-63 No. 620 was replaced by No. 820, Current Topics in Animal Breeding, in cooperation with the Departments

of Animal Science and Poultry Science and is still listed in the centennial catalogue, although in 1967-68 its title was changed to "Current Topics in Animal Genetics."

Entomology 652, Evolution of Insects, appeared for the first time in the catalogue for 1950-51 taught by Professor C. H. Kennedy. Later Professor D. H. Borror accepted the responsibility until the course was dropped after the Winter Quarter of 1961.

Horticulture 17, Plant Variations, by Professor Lazenby is the earliest and only course one can construe to be genetics ever listed by that department. It has been offered continuously since 1905-06 to the present day, albeit with two changes in number and (since 1921-22) under No. 601 and title, "Horticultural Plant Breeding." In the catalogue for 1944-45 the title erroneously appeared as "Horticultural Plant Feeding!" The course was taught from 1909-10 through 1939-40 by the late (deceased, 19 February 1953) Professor Wendell Paddock, who is not related to me in any way that I know. From 1947-48 through 1950-51 it was taught by F. E. Johnston, Jr. He was succeeded by W. N. Brown who died in August 1969.

The Department of Medicine and Clinical Medicine shortened its name to "Medicine" in 1932-33 and simultaneously introduced course No. 626, Human Heredity, with Zoology 403 stated as a "desirable prerequisite". It has been my understanding that this was the first genetics course in a

medical school in the nation, that Professor L. H. Snyder was the prime mover in initiating this course, and that he taught it from its beginning. It is thus strange that his name does not appear in the masthead of this department until 1936-37, at which time also the course number was changed to 679. In 1943-44 the course name changed to "Medical Genetics." Dr. Madge T. Macklin succeeded Dr. Snyder in teaching this course in 1947-48 and continued until her resignation in 1959-60. She returned to her home in Canada to settle her late husband's estate and died 14 March 1962. Dr. H. W. Aplington of the Department of Anatomy picked up where Dr. Macklin left off and taught the course until it was terminated in 1963-64.

In 1965-66 the College of Medicine set up three new courses in the area of genetics. Two were in the Department of Medicine. One of these was No. 751 e, entitled "Medical Specialties: Genetics", the other was No. 780 e, entitled "Individual Studies: Genetics". Their numbers were changed the very next year, respectively, to 751.06 and 793.06. The third course was in the Department of Pediatrics: No. 790 B, Individual Studies: Chromosome Study. It was changed in both number and title two years later to 793.02, Individual Studies: Genetics. The most recent new course is Pediatrics 850, Seminar: Human Genetics, also cross-listed as Medicine 850.07, being given for the first time this current Autumn Quarter in 1969 at Children's Hospital by Dr. Audrey M. Aubele, Ph.D.

The Department of Microbiology initiated No. 780, Microbial Genetics, in 1967-68, as its first venture in formal course work in the area of genetics.

Poultry Husbandry 606, Poultry Genetics, was the earliest genetics course in that department. It was first listed in 1932-33. Its number was changed to 502 in 1937-38 and back to 606 in 1940-41, which number it retained until its termination in 1962-63. The departmental name was changed in 1951-52 to "Poultry Science." No. 606 was terminated in favor of cooperation with the Departments of Animal Science and Dairy Science by cross listing three Dairy Science courses: 520, 720, and 820. This practice continues into the centennial year catalogue, but with No. 520 having been changed to No. 420 in 1966-67.

Course Consolidation

By the 1940's an understanding had developed that courses in theory and basic principles of genetics would be given in the botany and zoology departments, while courses in application would be handled in other departments. In botany, as mentioned above, Professor J. H. Schaffner arrived in 1905-06, began Botany 35, Evolution of Plants, in 1908-09 and Botany 121, Plant Genetics, in 1911-12. Botany 35 was changed to No. 611 in 1921-22 but continued without further change in either title or number until 1946-47. This is beyond Schaffner's assignment to full-time research duty in 1927-28 and his death on 27 January 1939. Also in 1921-22, Botany 121

was changed in number to 670 and in title to "Advanced Plant Genetics," and a newly introduced course, No. 635, Experimental Plant Genetics, to be taught by Professor A. E. Waller became held as a prerequisite. No. 670 ended with Schaffner's assignment to research duty. The following year (1928-29) the title of No. 635 was shortened to "Plant Genetics" and has remained unchanged to the present day although the number changed to 650 in 1967-68. I succeeded Professor Waller as teacher of this course in 1950-51. Actually 1921-22 was a banner year for genetics in botany for yet another new course, No. 805, Research in Genetics, was innaugurated. It was last listed in the catalogue for 1931-32. The catalogue for 1928-29 also included the initial listing of No. 637, Plant Cytology, to be taught by Professor Lois Lampe. This course was offered in alternate years (with a change to No. 737 in 1947-48) until her retirement and its termination in 1965. No. 740 was first listed in 1945-46 in the expectation that I would teach it. But I did not do so until spring quarter of 1949 partly because my salary was then budgeted in zoology but mostly because the famous "veteran's bulge" in enrollments (Tables 1 and 2) made spending time in such a course unthinkable. In calendar 1946 through calendar 1948 and winter quarter of 1949 I was on teaching duty in 12 of the 13 quarters and taught 20 sections of Zoology 403 plus 6 sections of Zoology 618 plus 2 sections of Botany 401. Botany 740 has been offered in alternate years to the present.

Table 1.

Enrollments in Genetics Courses listed under Botany*

Year	635	701	740	950
1947	-	3	-	-
1948	-	5	-	1
1949	-	8	12	3
1950	-	-	-	5
1951	14	1	8	7
1952	10	1	10	4
1953	9	1	-	8
1954	13	5	7	12
1955	7	1	-	6
1956	10	1	-	6
1957	9	-	-	6
1958	10	-	10	18
1959	15	1	-	14
1960	10	-	5	19
1961	10	-	-	16
1962	11	3	14	8
1963	11	1	-	7
1964	13	-	11	13
1965	13	-	-	2
1966	9	-	11***	11
1967	7**	3	-	10
1968	11	1	7****	5

* as available from Service Reports

** 635 changed to 650 as of Autumn Quarter 1967

*** Botany 740 changed to Biology 740 as of Spring Quarter 1966

**** Biology 740 changed to Biology 730 as of Spring Quarter 1968

It was changed to Biology 740 in 1964-65 at the same time that most genetics courses in the College of Biological Sciences made the same change. In 1967-68, its number was changed to 730 in connection with a general overhaul of the course numbering system. Under Botany 701, the topic of genetics was added in 1946-47, but the practice of separately listing such special topics was discontinued in 1949-50.

With the intention of developing a course in the area of fungus genetics, Dr. Peter R. Day joined the staff in botany in autumn 1962. He resigned in 1964 in favor of the position of Chief, Department of Genetics, Connecticut Agricultural Experiment Station, which position he still holds.

The first inkling of genetics in zoology appears in the catalogue for 1908-09 as Zoology 34, Evolution. The number was changed to 131-132 the very next year, but not again until 1921-22 when it became 409-410. In 1925-26 it was altered to a one-quarter course, No. 409. In 1929-30 it became No. 509 and remained so until 1964-65 when, as part of the recent organizing of the College of Biological Sciences, it became Biology 509. In 1967-68 it became Biology 420. Professor W. M. Tidd became its teacher in Summer Quarter of 1949 and still carries that responsibility. He greatly strengthened the emphasis on genetics in the course.

One year after initiating Zoology 34, Professor W. M. Barrows began offering Zoology 129-130. As described in the section on Beginnings, its title was changed once in 1914-15

and again in 1917-18, each change reflecting an increasing emphasis on genetics in the content of the course. With adoption of the quarter system on 1 July 1922, the course number was changed to 601-602-603 since it continued to be a course that required a whole academic year to complete. It was cut to a one-quarter course in 1926-27 however, thus becoming merely No. 601. In 1932-33 its title was changed to "Advanced Genetics" because under 2 years of being taught by Professor L. H. Snyder it had become totally a genetics course. The name was lengthened to "Advanced Human Heredity" in 1939-40 partly because two years earlier Zoology 602, Advanced Genetics, (thus duplicating the then title of No. 601) had been introduced as a Summer Quarter course to be given by Professor D. C. Rife and to cover a completely separate aspect of genetics from that covered by Snyder's 601. Probably there was not too much confusion, however, for 602 was listed in its first four summers as "not given."

To get back to No. 601: its title was shortened to "Human Genetics" in 1948-49, its number changed to 707, and its status changed to alternate year offerings the following year, reflecting Professor Snyder's resignation in 1947 to become Dean of the Graduate School at the University of Oklahoma. As No. 707 it became Professor Rife's course, and Rife's No. 602 became No. 840, Analysis of Modern Genetics. No. 707 was terminated in 1961-62 after having been taught once that year by Dr. V. L. House following Rife's resignation of 1958. No. 840 continued to be listed in the catalogues through 1961-62, but was listed as "not given" in every catalogue from 1955-56 on.

Zoology 115, General Principles of Heredity, first appears in the catalogue for 1917-18. It was thus historically the third genetics course in the department, even though current senior members of the staff recall it as the first. With the adoption of the quarter system in 1922 it became No. 403 and began to be offered in Summer Quarters. Professor Barrows taught it every summer through 1935, and also whatever other quarters it was offered in the academic year until 1930-31 when L. H. Snyder joined the staff and began to share this load with Barrows. It was offered all 4 quarters every year until its termination in 1961-62, only to be resurrected as Biology 403 in 1965-66. Two years later it was changed to Biology 130 and two years more later (in 1969-70) its number was changed to 314. Somewhere along the line, the word "General" dropped from the title. Following the resignation of Dr. Snyder in 1947, the 403 load fell principally on Rife, Green and myself. As they came and went through the years, Cotterman, Fox, Isenberg, and McIntosh were involved. In peak enrollment times, and for only one or two quarters each, Natalie Barish, William J. Schull, James A. Carlson, Dr. Cheng Mei Fradkin, Martha J. Gray, Harriet H. Parker, and Baldev K. Vig were given a teaching responsibility in the 403 course. Dr. Plaine and Dr. House were involved almost as soon as they joined our staff and continued so until 1961 when 403 was terminated. Dr. Plaine accepted the total responsibility for No. 403 when it was resurrected in 1965. Now that Dr. Plaine has become an Assistant Dean, Dr. Roger Clay has this responsibility.

Zoology 620, Evolution of the Animal Groups, first appeared in the catalogue for 1925-26 with the then No. 409, Evolution, as prerequisite. In each of the next 4 annual catalogues it was listed as "not given." In the 1930-31 catalogue its name changed to "Advanced Zoology of the Vertebrates" and the by then No. 509, Evolution, prerequisite was dropped. These changes made it no longer construable as a genetics course.

Course Expansion in Zoology

In 1934-35 a precedent was set. Zoology 630, Interpretation of Biological Data, appeared in the catalogue. It was not intended to be and never has been a course in genetics. But it and the subject area of biometry became fixed in the minds of many as lying in the bailiwick of genetics because C. C. Cotterman, a geneticist with a strong interest in mathematics and statistics, was its first teacher. The fixation has hardened as each successive teacher of it but one (Zoe, Green, Weaver, McIntosh, Skavaril) turned out to be a person with primary interest in genetics. The exception was C. R. Weaver, a biometrician-entomologist. The course has been offered at Columbus every year, sometimes at the Ohio Agricultural Experiment Station and at Wright Patterson Field, and often in summer quarter too, except in 1944-45 and 1945-46 when E. L. Green was serving in the United States Air Force.

In 1934-35 it had been 17 years since a viable new course had been introduced in the genetics area in the zoology department. In the following 18 years (through 1953-54)

9 other new courses were added four of which continue to the present day. Year-by-year enrollments from 1937 on as recorded in departmental Service Reports for all the genetics courses in the Department of Zoology and Entomology are listed in Table 2. The enrollments given for 701 and 950 include only students in the area of genetics. This period also included the founding of the Institute of Genetics in 1950. A separate section of this history is devoted to the institute.

Zoology 618, Cytological Basis of Genetics, was introduced in 1940-41 by Professor W. J. Kostir, with Zoology 403 held as prerequisite. In the Spring Quarter of 1946, I was understudying him preparatory to assuming full responsibility for the course in and after the following (Summer) Quarter. But my baptism came in the middle of that spring when Professor Kostir underwent major surgery. I taught it again in spring and autumn of 1947, autumn of 1948, and winter of 1949. Since then it has always been a Winter Quarter course. It became Biology 618 in 1964-65, then Biology 631 in 1967-68. At this early time in my career at O.S.U. (1947-50) my office space, the 403 classroom, and the 618 classroom were all in a "temporary" army barracks building that had been dismantled at Wright-Patterson Air Base, hauled to Columbus, and reassembled, between the Botany and Zoology Building and Campbell Hall on the west side of Neil Avenue. We moved out of it in 1950 with the completion of a second and third floor on the north wing of B. & Z., but the barracks building continued in service for at least another 15 years.

Table 2.

Enrollments in Genetics Courses listed under Zoology (and Medicine)*

Year	403	412***	509	630	Medicine 679
1937**	541	-	53	-	85
1938	732	-	86	23	77
1939	802	-	100	31	75
1940	873	-	78	33	85
1941	782	-	66	15	68
1942	666	-	66	27	73
1943	612	-	111	18	76
1944	353	-	15	-	-
1945	279	119	23	-	159
1946	428	341	46	-	76
1947	905	395	72	83	89
1948	965	396	98	96	76****
1949	620	296	104	95	-
1950	725	245	103	101	-
1951	636	217	72	104	-
1952	526	134	70	106	-
1953	411	63	54	107	-
1954	385	132	72	76	-
1955	418	97	108	67	-
1956	407	99	91	85	-
1957	402	74	69	63	-
1958	476	-	91	89	-
1959	453	-	77	77	-
1960	318	-	95	54	-
1961	?	-	?	?	-
1962	422	-	47	57	-
1963	140	-	131	34	-
1964	-	-	126	65	-
1965	-	-	188	90	-
1966	170	-	250	207	-
1967	254	-	277	118	-

* as available from Service Reports
** Spring Quarter only
*** 412 changed to 512 as of Autumn Quarter 1956
**** continued to be taught until 1959-60 by Madge T. Macklin, M.D., ~~Medicine 679.~~

Enrollments in Genetics Courses listed under

Zoology (continued)

Year	601*	602**	603***	618
1937#	-	-	-	46
1938	18	-	-	35
1939	16	11	-	24
1940	17	8	-	26
1941	9	10	-	17
1942	16	-	-	14
1943	8	17	-	9
1944	8	11	-	4
1945	14	4	-	14
1946	10	13	-	17
1947	18	14	-	57
1948	31	38	-	22
1949	23	45	-	27
1950	17	34	-	21
1951	5	-	35	22
1952	-	-	36	19
1953	16	-	29	7
1954	-	8	23	8
1955	5	-	40	7
1956	-	-	59	8
1957	10	-	35	16
1958	-	-	41	8
1959	6	-	59	9
1960	-	-	56	14
1961	-	-	?	15
1962	-	-	39	19
1963	-	-	217	10
1964	-	-	239	18
1965	-	-	183	16##
1966	-	-	147	16
1967	-	-	187	6

* 601 changed to 707 as of Winter Quarter 1951
** 602 changed to 840 as of Autumn Quarter 1954
*** 603 changed to 604 as of Summer Quarter 1962
\# Spring Quarter only
Zoology 618 changed to Biology 618 as of Winter Quarter 1965

Enrollments in Genetics Courses Listed Under

Zoology (continued)

Year	701	705**	706	708#	709##
1937*	2	-	-	-	-
1938	13	-	-	-	-
1939	24	-	-	-	-
1940	13	-	-	-	-
1941	4	-	-	-	-
1942	8	-	-	-	-
1943	5	-	-	-	-
1944	11	-	-	-	-
1945	2	-	-	-	-
1946	8	-	-	-	-
1947	12	-	-	-	-
1948	8	-	-	-	-
1949	19	20	-	-	-
1950	9	8	8	-	-
1951	10	10	-	-	-
1952	11	6	8	-	-
1953	8	12	-	-	-
1954	3	-	-	-	-
1955	3	-	-	-	-
1956	1	5	10	-	-
1957	-	9	-	-	-
1958	-	10	9	-	-
1959	2	11	-	10	-
1960	1	-	3	-	8
1961	?	?	-	-	-
1962	3	-	7	-	14
1963	-	6	-	-	-
1964	-	-	-	-	9
1965	5	9	-	-	-
1966	6	-	-	-	8
1967	1	-	-	-	-

* Spring Quarter only
** 705 changed to 830 as of Spring 1963
\# 708 changed to 816 as of 1962-63
709 changed to 831 as of 1962-63

Enrollments in Genetics Courses Listed Under

Zoology (continued)

Year	801	815	900	950*
1937**	-	-	-	8
1938	-	-	-	10
1939	-	-	-	15
1940	-	-	-	8
1941	-	-	-	14
1942	-	-	-	10
1943	-	-	-	1
1944	-	-	-	3
1945	-	-	-	-
1946	-	-	-	-
1947	-	6	-	5
1948	-	2	35	5
1949	-	5	32	16
1950	-	-	19	13
1951	-	-	32	19
1952	-	-	29	20
1953	-	-	27	31
1954	-	-	7	16
1955	-	-	10	7
1956	-	-	11	8
1957	-	-	-	5
1958	-	-	3	1
1959	-	-	-	4
1960	-	-	-	20
1961	-	-	-	?
1962	-	-	-	9
1963	-	-	-	10
1964	1	-	-	8
1965	1	-	-	11
1966	4	-	-	15
1967	18	-	-	11

* Paddock's listed under Botany in Table 1

** Spring Quarter only

The biometrics component of the genetics program was expanded in 1940-41 with the introduction of Zoology 815, Statistical Design of Biological Experiments, with Zoology 630 held as prerequisite. It was listed in 13 successive annual catalogues, but as "not given" in 9 ~~of the last 10~~ before its termination in 1952-53.

In 1943-44, Zoology 412, Heredity and Racial Groups, was initiated by Professor D. C. Rife in the Twilight School. The very next year it was offered in the regular academic program as well as in Twilight School, and soon was being offered in all 4 quarters. It had no prerequisites, nor was it acceptable in satisfaction of prerequisites of any other genetics course. It was an end in itself, designed for students whose careers would lie in education, sociology, law and psychology. Genetics has obvious applications and implications in these fields yet an apallingly large proportion of those students were completing their undergraduate degrees with no contact of any kind whatever even with biology let alone genetics. Although L. Isenberg, Dr. Elsie D. Helsel, and J. Tullis taught it at various points along the way, the course was uniquely Rife's and terminated in 1958-59 following his resignation to join the United States Department of State.

In 1945-46 the topic, "Genetics and Biometry" was added as Item d under Zoology 701, Special Problems. The total list of such topics ran through Item j. Two years later genetics was given individual recognition as Item e while Item d became biometry alone. This persisted until 1967-68 when the course number and title were changed to 693 and Individual Studies, respectively.

Three new courses were introduced simultaneously in 1947-48: No. 705, Physiological Genetics, No. 706, Population Genetics, and No. 900, Seminar in Genetics.

No. 705 was not actually taught until Spring Quarter 1949 because the "veteran's bulge" in enrollments kept A. S. Fox (who was appointed to teach it) too busy with No. 403. While in Italy on a Fullbright Research Fellowship in 1953-54, Fox resigned. Dr. H. L. Plaine joined us in 1954-55 and took responsibility for No. 705 until his 1969 appointment as Assistant Dean in the College of Biological Sciences, the course in the meantime having had a change to No. 830 in 1962-63 and to Biology 830 in 1964-65 under which it is found in the centennial catalogue.

No. 706 was set up as an alternate years course and was taught by E. L. Green until his resignation in 1957-58 to become Director of the Jackson Memorial Laboratory at Bar Harbor, Maine. Dr. W. B. McIntosh immediately succeeded to the responsibility for this course. He resigned in 1962-63 to go as a civilian with the Department of Defense (Army). The course was dropped in 1961-62 but is to be resurrected in 1970-71 and taught by Dr. S. S. Y. Young.

In connection with No. 900 it needs to be mentioned that L. H. Snyder had organized a regular weekly Friday afternoon genetics seminar group in 1934. The vigor of this informal seminar was a strong factor in the origin of the Institute of Genetics, became a principal one of the tangible activities of the institute, and, along with the institute, had faded

away by 1961. No. 900 was organized for students because it had become a fact that students were overawed by the institute. Responsibility for No. 900 rotated among the staff, each member taking it over for one quarter. The rotation was upset by the three resignations in 4 years mentioned above. No. 900 lost its genetics specificity when taken over by the zoology department in 1961-62.

Zoology 603, Fundamental Genetics, was first listed in the catalogue for 1949-50 and taught that year by A. S. Fox. It had no prerequisite genetics courses. It differed from the 403 in emphasizing the derivation rather than the application of principles and in having laboratory work. That is, it covered introductory genetics in one quarter with only 3 lectures a week, which in 403 required 5 lectures a week. During Fox's year in Italy (1954), I taught No. 603. The following year, H. L. Plaine joined us and took over No. 603. In 1962-63, No. 603 was changed to 604.

The ninth course to be added since 1933-34 was No. 708, Quantitative Genetics. It was first listed in the catalogue for 1953-54. In its first 4 years it was listed as "not given." The principal cause of this was E. L. Green's leave of absence for 2 years while he was associated with the United States Atomic Energy Commission. These were also the 4 years during which we had 3 resignations plus D. C. Rife being in Uganda during 1954-55 as a Fullbright Professor.

In 1958-59, No. 709, Nature of Gene Action, was initiated by Dr. V. L. House to handle the area of developmental genetics. It became No. 831 in 1962-63 and became Biology 831 in 1964-65. At this same time 7 other courses were changed to the "Biology" designation: Botany 740, and Zoology 509, 604, 618, 630, 816 and 830.

In 1965-66, the old Zoology 403 was resumed, after a lapse of 3 years, as Biology 403. It was changed to No. 130 in 1967-68 and to No. 314 in 1969-70. Six other courses also had changes of number in 1967-68:

604 became 630

618 became 631

630 became 650

701 became 693

740 became 730

816 became 832

This same year two new courses came in: Biology 651, Analysis and Interpretation of Biological Data II, to be taught by Dr. W. R. Harvey, and Biology 694.04, Special Group Studies: Genetics. A "I" was added to the title of Biology 650 (the former No. 630) which Dr. R. V. Skavaril has taught since 1965.

In 1969-70 all genetics courses now labelled Biology will become labelled as Genetics, with no changes of number. Botany 650 will become Genetics 632. But a new course, Behavior Genetics, will be introduced as Zoology 840 to be taught by Dr. W. C. Rothenbuhler. Also in this current year, Genetics 630 B, Genetics Laboratory, is under way with R. H. Essman in

charge under the direction of Dr. V. L. House.

Our proposed Genetics Graduate Program having been approved by the Graduate Council on 8 November 1969, we expect soon to initiate the following proposed courses:

Genetics 800 (Staff) . . . . . A,W,S
Genetics seminar (reinstate)

Genetics 8xx (Griffing) . . . . . A
Transmission genetics theory (a new proposed course(even)

Genetics 850 (Young) . . . . . W
Theoretical and experimental population genetics (a new proposed course)

Genetics 8yy (Griffing) . . . . . A
Quantitative genetics and selection theory (course given once)

Genetics 999 (Staff) . . . . . A,W,S,Su
Research

Curricula for an Undergraduate Major

A campus-wide listing of genetics courses first appeared in the university catalogue for 1944-45 on pages 565-566. In 1949-50, as part of the activity that lead to the founding of the Institute of Genetics, the list was brought up to date, and an actual curriculum appeared for the first time. The curriculum was in the College of Agriculture and on pages 392-393 of the catalogue for 1949-50. The campus-wide course list and the curriculum continued to appear in each annual catalogue through 1958. The same year also marked the termination of a curriculum in the College of Arts that had first appeared on page 372 of the catalogue for 1954-55.

In the Spring Quarter of 1969 a curriculum in genetics leading to the Bachelor of Science degree that had been proposed by the Academic Faculty of Genetics was approved by the Colleges of the Arts and Sciences Curriculum Committee so should appear in the forthcoming catalogue for 1970-71.

Graduate Degrees

Graduate students wishing to specialize in genetics have had to enroll in an existing department. Only in the Department of Zoology and Entomology did I find records in which such students were identifiable, and even there only in the period beginning in 1949, as follows:

1949	13	1959	8
1950	17	1960	12
1951	12	1961	11
1952	15	1962	11
1953	10	1963	8
1954	7	1964	9
1955	7	1965	11
1956	4	1966	12
1957	3	1967	7
1958	2	1968	9
		1969	17

Graduate students who specialized in genetics also have had to accept their graduate degrees from an existing department. Following are a list of 187 such students who earned the M.Sc. degree and a list of 51 who earned the Ph.D. degree. Each list is arranged with the departments in alphabetical order.

MASTER OF SCIENCE DEGREES IN THE AREA OF GENETICS

Date	Name	Advisor
	Awarded by the Department of Agronomy	
1959	Singh, Mukand	Ray
1961	Mathur, Jaswant R.	Lamb, Ray
1969	Hoffman, Jack E.	Ray
Awarded by the Department of Botany and Plant Pathology		
1898	Fullmer, Edward Lawrence	?
1912	McAvoy, Blanche	?
1914	Perry, Fred Edwards	?
1914	Humphrey, Lillian Eaton	?
1916	Waller, Adolph Edward	Schaffner
1925	Stauffer, Andrew	Schaffner
1926	Camp, Wendell Holmes	Transeau
1930	Li, Liang Ching	Blaydes
1940	Ellett, Clayton Wayne	Stover
1941	Efros, David Kenneth	Meyer
1947	Sheth, Dolatray Sunderji	Rife, Paddock
1948	Heaslip, Margaret Barkley	Wolfe
1949	Campbell, Thomas Hodgen	Allison
1954	Lengel, Patricia Ann	Blaydes
1954	Thompson, James Marion	Paddock
1954	Tullis, James Earl	Paddock
1955	Jones, John Paul	Alexander
1960	Essman, Robert Harold	Paddock
1960	Zamierowski, Edward Eugene	Gilbert

Awarded by the Department of Botany and Plant Pathology (cont.)

1965	Hite, Raymond E.	Alexander
1965	Settle, Wilbur Jewell	Fisher
1966	Dryer, Ross Edward	Paddock
1967	Hoskins, Robert Wayne	Paddock
1967	Rauch, Beverly Jean.	Paddock

Awarded by the Department of Dairy Science

1951	Baldwin, Charles	Gilmore
1954	Laird, Robert	Gilmore
1961	Herschler, Michael S.	Fechheimer
1962	Franks, Edwin	Fechheimer
1962	McConnell, John	Fechheimer
1964	Parkhie, M. R.	Gilmore
1965	Harper, Ronald L.	Fechheimer
1966	Zartman, David L.	Fechheimer
1967	Bouic, Frank A.	Brakel
1968	Miller, Robert C.	Fechheimer

Awarded by the Department of Poultry Science

1948	Buckingham, Richard D.	Jaap
1949	Ingram, Robert S.	Jaap
1949	Renard, Mell M.	Jaap
1952	Beck, Jason N.	Jaap
1957	Temple, Roger W.	Jaap
1966	Mehta, Vridi Singh	Jaap
1968	Clancy, James A.	Jaap

Awarded by the Department of Zoology and Entomology

1923	Price, John W.	Barrows
1924	Spencer, Warren P.	Barrows
1931	Rife, David C.	Snyder
1931	Schwartz, Samuel H.	Snyder
1931	Wortham, Joseph H.	Snyder
1932	Cameron, R. Douglas	Snyder
1933	Alden, John S.	Snyder
1933	Deafenbach, Adaline B.	Snyder
1933	Hyman, Harriet S.	Snyder
1933	Seyler, Zelma K.	Snyder
1933	Yospur, David H.	Snyder
1934	Lee, Benjamin F.	Snyder
1934	Reiches, Aaron J.	Snyder
1934	Schwartz, Jacob	Snyder
1934	Smeltzer, Mae Jenkins	Snyder
1935	Davidson, D. Franklin	Snyder
1935	Setterfield, Wilma	Snyder
1935	Andrew, Bertha	Snyder
1936	Katz, Sidney C.	Snyder
1936	Lockshin, Abraham D.	Snyder
1937	Boye, Charles L.	Rife
1937	Cotterman, Charles W.	Snyder
1937	Elsas, Donald H.	Snyder
1938	Wilkens, Lawrence A.	Rife
1941	Cromwell, Howard R.	Rife
1947	Snedeker, Dorris M.	Rife

Awarded by the Department of Zoology and Entomology (cont.)

1948	Bean, Patricia Fehlman	Rife
1948	Madison, Caroline Rabb	Green
1949	White, Shirley Plummer	Green
1949	Ross, George	Rife
1950	White, William John Jr.	Paddock
1951	Cretekos, Lola	Paddock
1951	Dittman, Ilse	Paddock
1951	Feldmiller, Victor A.	Fox
1951	Forsthoefel, Paulinus F.	Green
1951	Hensel, Jean Leugers	Green
1951	Jackson, Joan Marie	Paddock
1951	Joy, Samuel John	Rife
1952	Gray, Martha Jean	Paddock
1952	Maurer, Margaret A.	Green
1952	Wolf, Robert O.	Fox
1953	Hrubant, H. Everett	Green
1953	Les, Edwin P.	Green
1953	Overton, Louise F.	Green
1953	Trimble, Jimmy R.	Green
1954	Margroff, Dale	Rife
1954	Pemberton, Charles	Rife
1955	Randall, John G.	Paddock
1958	Schneider, Imogene P.	Paddock
1960	Carlson, James H.	House
1960	Marzluf, George A.	Plaine
1961	Skavaril, Russell V.	Plaine

Awarded by the Department of Zoology and Entomology (cont.)

1961	Yeatts, Virginia D.	House
1962	McClanahan, Charlene	House
1962	Mikolaj, Peter J.	Paddock, Myser
1962	Tissot, Robert G.	McIntosh
1965	Neiderhuber, Sally G.	House
1966	Ebersole, Lynn A.	House
1966	Engel, Helen B.	Plaine, Snell
1967	Gelpe, Marcia R.	House
1967	Rimbey, Marilyn H.	House
1968	Song, Chung Min	Plaine
1968	Oleksiak, Lawrence Charles	Plaine, Skavaril

DOCTOR OF PHILOSOPHY DEGREES IN THE AREA OF GENETICS

Awarded by the Department of Agronomy

1962	Singh, Mukand Cytoplasmic effects on agronomic characters in maize.	Ray
1963	Thompson, James Marion Husk extension of field corn in breeding for resistance to bird damage.	Ray
1964	Mathur, Jaswant R. Effect of row spacing, uncropped border area, and adjacent varieties on yields of winter wheat.	Lamb, Ray
1964	Bains, Darshan S. Lodging in spring oats.	Ray
1967	Russell, William J. Effect of defoliation treatments at various stages of plant development and row spacings on corn (Zea mays L.) production.	Ray

Awarded by the Department of Botany and Plant Pathology

1939 Spencer, Jack Taif — Blaydes
Root Studies of Some Inbred Lines and Hybrids of Maize.

1944 Conley, Sister Angelita — Blaydes
An Anatomical and Cytological Study of Nephrolepis exaltata and Some of its Varieties.

1945 Dickason, Frederick Garrett — Transeau
A Phylogenetic Study of the Ferns of Burma.

1948 Koshy, Theverthundyil Abraham — Allison
Morphology and Genetics of Ascobolus striisporus.

1949 Reddy, Nallari Satyanarayana — Rife, Paddock
Cytological Studies in Coleus.

1950 Heaslip, Margaret Barkley — Wolfe
Some Cytoecological Aspects in the Evolution of Certain Species of the Plant Genus Silene.

1950 Parker, Joanne — Blaydes
Morphological and Cytological Studies of Five Species of Sansevieria Thurb.

1958 Jones, John Paul — Alexander
The Relation of Certain Environmental Factors, Tobacco Mosaic Virus Strains, and Sugar Concentration to the Blotchy Ripening Disease of Tomato and the Inheritance of the Tendency to the Disease.

1958 Henry, Robert David — Blaydes
Morphological Studies of Diploid and Autotetraploid Plants of Physalis pruinosa L.

1960 Huang, Pien Chien — Paddock
On the Action of the Semi-dominant Lethal Gene, Wo, in Lycopersicon esculentum Mill.

1961 Tegenkamp, Thomas Richard — Paddock
Phenomena Associated with Hereditary Albinism in Avena.

Awarded by the Department of Botany and Plant Pathology (cont.)

1963 Alexander, Mangalatth Philip — Paddock
Investigations of the Microgametophyte Lethal-simulating x Locus in Lycopersicon esculentum Mill. and L. pimpinellifolium Mill.

1964 Hartman, Donald George — Paddock
An Investigation of the Possibility of Correlation Between Human Handedness and Differences in Length of Arm and Leg Long Bones, with a Genetic Interpretation.

1967 Vig, Baldev Krishnan — Paddock
Experimental Alterations of Leaf Spot Frequencies in Glycine max (L.) Merrill, with Reference to the Mechanism of Spot Formation.

1968 Cooke, John Francis, Jr. — Fisher
The Cytology and Chromatography of Some Cultivated Members of the Genus Hosta Trett.

1968 Spang, Henry Arthur — Burley
The Effect of Plant Growth Substances on the Hyperchromiticity of DNA.

Awarded by the Department of Dairy Science

1957 Fechheimer, Nathan S. — Gilmore
Chromatin Variations in Bovine Spermatogenic Cells.

1958 Brandt, Graydon W. — Gilmore
Heterosis in Dairy Cattle as Measured by Birth Weights, Gestation Lengths, Certain Body Weights and Measurements, and Mammary Gland Grades.

Awarded by the Department of Dairy Science (cont.)

1960 Treece, Jack M. — Gilmore
Environmental and Genetic Influence on Milk Composition with Particular Reference to the Protein.

1964 Herschler, Michael S. — Fechheimer
The Chromosomes of Cattle: Their Association with Phylogenic and Ontogenic Processes with an Intensive Study of the Freemartin Syndrome.

1968 Zartman, David L. — Fechheimer
A Chromosome Study of Pigs Derived from Irradiated Male Swine and Semen.

Awarded by the Department of Horticulture and Forestry

1952 Shilling, Paul Richard — Paddock, Howlett
Investigation of the hereditary character, woolly, in the tomato.

1954 Kalia, Het Ram — Paddock, Howlett
A cytogenetic study of asynapsis in tomato (Lycopersicon esculentum Mill.).

Awarded by the Department of Poultry Science

1949 Godfrey, George F. — Jaap
On the Nature of Genetical Control of Egg Shell Quality as it Affects Hatchability in Domestic Fowl Which Lay Brown Eggs.

1952 Godfrey, Edward F. — Jaap
The Genetic Control of Adult Body Size in the Domestic Fowl.

1953 Coleman, Theo H. — Jaap
Heterosis for Growth and a Method for Intensifying this Phenomenon in the Domestic Fowl.

1954 Grimes, John F. — Jaap
Growth and Egg Production of Purebred, Crossbred, and Incross-bred Poultry.

Awarded by the Department of Poultry Science (cont.)

1959 Goodman, Billy Lee — Jaap
Use of the Polyallel Mating System to Measure Heritabilities and Gene Interactions in Poultry.

1959 Smith, James H. — Jaap
Genetics of Body Size in a Randombred Population of the Domestic Fowl.

1964 Nestor, Karl E. — Jaap
Genetics of Chick-comb Response to Androgen and Gonadotrophin.

1967 Muir, Forest V. — Jaap
Genetic Increase in Bursa of Fabricius Weight at Hatching and Correlated Responses in the Domestic Fowl.

1968 Dev, Dalbir Singh — Jaap
Selection REsponse and the Nature of Genetic Variation for Eight-week Body Weight in the Domestic Fowl.

Awarded by the Department of Zoology and Entomology

1929 Spencer, Warren P. — Barrows
Genetic Studies on Drosophila.

1933 Heizer, Edwin E. — Snyder
The inheritance of milk and butter-fat production in dairy cattle.

1933 Rife, David C. — Snyder
A genetic study of monozygotic twins.

1936 Hyman, Harriet S. — Snyder
Genetic studies of the immune agglutinogens M and N.

1940 Cotterman, Charles W. — Snyder
A calculus for statistico-genetics.

1941 Boye, Charles L. — Rife
A genetic study of coleus.

1942 Kloepfer, H. Warner — Snyder
An investigation of 171 possible linkage relationships in man.

1946 Halperin, Sidney L. — Snyder
A genetic study of mental defect.

1949 Schull, William J. — Rife
An analysis of the mode of inheritance of the pattern of the superficial veins of the anterior thorax.

1952 Madison, Carolyn Rabb — Green
The growth and differentiation in vitro of tissue from normal and short ear mouse embryos.

1953 Chovnick, Arthur — Fox
A physiological study of the lozenge pseudoalles in Drosophila melanogaster.

1953 Forsthoefel, Paulinus F. — Green
The developmental genetics of luxoid, a new skeletal variation in the house mouse, Mus musculus.

Fox, ↑

1954 Barish, Natalie — Paddock
An immunogenetic study of the vermilion mutants in Drosophila melanogaster.

1954 Brakel, William J. — Rife
A genetic analysis of the American Jersey Cattle Club star bull program.

1954 Honeyman, Merton S. — Green
A quantitative genetic study of a nutritional difference between two pure lines of the house mouse.

1957 Hrubant, H. Everett — Green, D. F. Miller
A chromatographic analysis of the free amino acids in the blood plasma of three inbred strains of the house mouse, Mus musculus.

1959 Les, Edwin Paul — McIntosh
A study of the effects of single locus heterozygosity on traits which may have survival value in eight stocks of laboratory mice.

1960 Greider, Marie Helen — Paddock
An electron microscope study of the degradation of deoxyribonucleic acid by deoxyribonuclease.

1961 Ambellan, Elizabeth Higgens — Plaine, Webster
The effect of nucleobios on morphogenesis and ribonucleic acid synthesis in amphibian embryos.

1961 Daugherty, Patricia Ann — McIntosh
A gel diffusion analysis of tissue antigens of two species of mice, Peromyscus maniculatus and Mus musculus.

1961 Tullis, James E. — Paddock
A maternally transmitted "sex-ratio" condition in Aedes aegypti (L.).

1962 Dawson, Wallace D. — McIntosh
Experimental hybridization between Peromyscus maniculatus and Peromyscus polionotus with special reference to physiological isolation and size inheritance.

1963 Carlson, James H. — House
Genetic and environmental sources of variability with reference to a mutant venation phenotype in Drosophila melanogaster.

1964 Crowl, Robert H. — Plaine
An evaluation of tyrosine, tryptophan, and dopa as agents capable of preventing depigmentation of the hair of mice subjected to X-ray irradiation.

1964 Skavaril, Russell V. — Plaine
The effects of total-body irradiation with X-rays and supplementary injections of liver homogenate upon the survival period in inbred lines of the Syrian hamster, Mesocricetus auratus (Waterhouse).

1966 Aubele, Audrey M. — Plaine
A comparison by means of X-irradiation in air and in oxygen of the suppressor-erupt systems in several strains of Drosophila melanogaster.

1966 Brooks, Gretchen Terhune — Plaine
Effects of X-rays, tryptophan metabolites, and eye color mutants on the tumor-suppressor system in Drosophila melanogaster.

Awarded by the Department of Zoology and Entomology (cont.)

1968 Lutes, Charlene House
Some considerations of the relationship between genotype and phenotype of the ci mutant in Drosophila melanogaster.

The Institute

The first Institute of Genetics in the entire United States was founded at The Ohio State University in May 1950. To be sure there were already departments of genetics, institutes of human genetics, and institutes of human biology at other universities, but none intentionally emphasized all phases of genetics including plant, animal, human, applied and theoretical. The idea of an institute had germinated in 1947. The need was obvious for an officially recognized interdepartmental organization what with research projects in theoretical and applied genetics being conducted in 14 departments, in 3 colleges, and formal courses in genetics being taught in 8 departments, in 3 colleges. Also, much research in genetics had always been under way at The Ohio Agricultural Experiment Station, and these years were a period in which the university and station administrations were actively promoting liaison and interaction across the 90 miles that separated them.

On 8 January 1948, the following group of 5 geneticists in 5 departments sent a proposal to Dean N. Paul Hudson of the Graduate School:

Lewis C. Saboe	Agronomy
L. C. Ferguson	Bacteriology
R. George Jaap	Poultry Science
J. W. Spuhler	Sociology
D. C. Rife	Zoology & Entomology

After study of this proposal, the Executive Committee of the Graduate Council recommended establishment of an Institute of Genetics ". . . in principle. . ." on 23 January 1948. The Graduate Council approved the recommendation at its February meeting. Dean Hudson forwarded the proposal and its record of approvals (plus his personal approval) to President H. L. Bevis on 2 March for possible presentation to the Board of Trustees. With this encouragement the "Genetics Group" actively attacked one of its proposed functions: that of coordinating instructional programs in genetics campus-wide. At a meeting of 26 May 1949 the reports of 3 subcommittees were heard in which each and every genetics course on campus was evaluated. These reports were amalgamated into a proposal the result of which would be a campus-wide coordinated array of genetics courses. This proposal was so well received and so effectively acted upon by the several affected departmental chairman that on 23 May 1950 Vice President Harlan Hatcher answered Dean Hudson approving ". . . the establishment of an Institute of Genetics as an informal interdepartmental organization . . . without budgetary provisions for a Director or office secretary or expenses." The new institute was placed under the supervision of the Graduate School. Dean Hudson wrote an

article, "Establishment of the Institute of Genetics," in the Graduate School Record of August 1950. Reprints of it were available at the Mendel Jubilee meeting of the Genetics Society of America, which was held in connection with the national meeting of the American Institute of Biological Sciences, on our campus in September 1950. (See Appendix)

A prominent feature of the Jubilee was the presence of Dr. Hugo Iltis' collection of Mendeliana, including all of the known original manscripts of Gregor Mendel. It was intended that Dr. Iltis would join us as Curator of his Mendel Museum upon his retirement and the collection therefore remained on display in the Ohio Union beyond the Jubilee. But we failed in our efforts to finance a stipend for Dr. Iltis and the collection was shipped back to him in December 1950. In 1958 the University of Illinois purchased all the original Mendel items from his widow.

Out of the flurry surrounding the Mendel Museum prospect grew the idea for a set of educational exhibits. In support of this, modest sums were received in 1951 from the Ohio State Development Fund and the Ohio Seed Improvement Association. In subsequent years, these two organizations made additional and larger donations to this project. Dr. Nancy Ziebur, with a Ph.D. in genetics from the University of Wisconsin and considerable professional experience as a commercial artist, designed and constructed 6 large lighted cabinets and one large wall case in which the application of genetic principles in the production of hybrid seed corn, the principle of multiple alleles, and the physical basis of inheritance were depicted.

The multiple allele display was the last to be done, in 1955. There also were smaller instruments and mechanical models for demonstrating the probability aspects of genetics. The entire display was put on exhibit at the Ohio State Fair in 1956. Now it is all out of sight gathering dust.

To get back to 1950 and the founding of the Institute: Dr. D. C. Rife was elected Chairman, and was re-elected by the Executive Committee every year through 1956. The year-by-year changes in the personnel of the Executive Committee were:

Term began in January of:						
1951	Rife	Ferguson	Gilmore	Green	Paddock	Lamb
1952	"	"	"	"	re-elected	re-elected
1953	"	"	Fox	Schlumberger	"	"
1954	re-elected	Jaap	Saboe	"	"	"
1955	"	"	"	"	re-elected	Gilmore
1956	"	"	Green	Lessler	"	"
1957	re-elected	re-elected	Brakel	"	"	"
1958	McIntosh	"	"	"	re-elected	Fechheimer
1959	"	"	Lamb	Macklin	"	"

No doubt part of the reason I am now delegated to write this history is that I was the only one to serve continuously. In 1951-52, while Dr. Rife was away in Egypt on a Fullbright Fellowship, Dr. C. A. Lamb was Acting Chairman. In 1955-56 while Dr. Rife was away in Uganda, again on a Fullbright Fellowship, Dr. L. C. Saboe served as Acting Chairman in the latter half of 1955. Then Dr. E. L. Green served as Acting Chairman in the early half of 1956. I was elected Chairman in January 1957. Dr. Green

resigned his professorship as of 1 October 1956, Dr. Rife resigned his in July 1958. So I was elected Chairman again in 1958 and 1959 during which time the Institute gradually faded away. In this connection, the Report to the Faculty Council on Research Development by Dr. Karl E. Krill, Assistant to the Vice President, Research Development and Institutes, published in Volume I, Special Number 1 of Report to the Campus on 11 February 1958 contains the following remark in item 7 on page 5, "We have five to seven institutes that are running at little above idle speed. They have never been given the staff they need, the laboratory space and equipment they should have, or any funds for research support. -- We can't dismiss the institutes with an admonition to 'show some vigor at the roots before you ask for help'; they have shown considerable vigor at the roots and now ask a little room to grow." The last official act of the institute was sponsorship in cooperation with the Graduate School of a seminar talk by Dr. M. M. Rhoades of Indiana University on 24 April 1959. The Institute has not been officially disbanded, however. But a few other kudos require recording. The Institute assisted numerous of its members in getting research grants, and received grants in its own name from the Ohio State University Development Fund in each of the years 1950-58, inclusive.

The Institute was studied and used as a model by several other universities. Under its aegis, the weekly seminars came to include speakers from all about the country and from abroad so frequently that, as mentioned earlier, it was necessary to

introduce Zoology 900 as a special seminar course so our students could do some speaking. The Institute assembled a collection of approximately 7000 reprints of articles in genetics and arranged it to be readily available to graduate students and staff. In Spring Quarter of 1953 it sponsored a series of 8 weekly symposia that were broadcast live over WOSU radio. The general topic of the series was "Heredity and Human Welfare." In January 1957 the institute released a list of 49 sponsored research projects that were being conducted by its members during 1956. The list is reproduced in full in this history in the section on Research. (See pages 54-61). The Institute stimulated and guided the organizing of a Subsection of Genetics in the Ohio Academy of Science. The first meeting was held on 24 April 1953 with 16 scientific papers. In 1961 the Subsection became a Section and had a program of 18 papers. The Section is still going strong. The year by year frequencies of papers and name of the Section chairman are given in Table 3.

In 1954 a 16 page brochure on the Institute was published by the Graduate School. A xerox copy is appended. The brochure was written by a committee consisting of Professors R. G. Jaap, V. C. Finkner with L. O. Gilmore Chairman.

The Institute had two classes of membership. Full membership was extended, on application, to members of the University faculty and to members of the Agricultural Experiment Station staff. Associate membership was extended, on application, to all other persons having an interest in

genetics and residing in Ohio. The name of each person who ever was a member in either category is listed in Table 4 along with the year of his application and the category of his membership.

One meeting each quarter was held at the Agricultural Experiment Station in Wooster, with the Columbus group attending. By 1956 the Wooster group had become so large and active that it held 4 meetings on its own. The November 1956 Annual Meeting was also held there.

The speakers at the November Annual Meetings were:

1950 Business session only

1951 Business session only

1952 O. C. Woolpert, O.S.U. Research Foundation - "The Role of the Research Foundation at the University"

1953 L. O. Gilmore, O.S.U. and Ohio Agricultural Experiment Station - "Problems in Dairy Cattle Breeding"

1954 W. R. Singleton, Brookhaven National Laboratory - "Effects of Radiation on Field Crops"

1955 N. Paul Hudson, O.S.U. Graduate School - "The Role of Institutes in the University"

1956 W. P. Spencer, College of Wooster - "Genetics ad infinitum"

1957 Karl E. Krill, O.S.U., Assistant to Vice President "Research Development and Institutes"

1958 Business session only

Table 3

Genetics in the Ohio Academy of Science

Year	No. of papers	Chairman
1953	16	Rife (O.S.U.)
1954	9	Rife (O.S.U.)
1955	7	Hefner
1956	9	Spencer
1957	9	Dean
1958	7	Fechheimer (O.S.U.)
1959	6	Cooper
1960	17	Cohen
1961*	18	Gilmore (O.S.U.)
1962	16	Paddock (O.S.U.)
1963	13	Jaap (O.S.U.)
1964	12	Steinberg
1965	14	Cohn
1966	15	Fechheimer (O.S.U.)
1967	11	Gregg
1968	15	McQuate

* Full Section K status gained

Table 4.

Membership List of the Institute of Genetics

Name	Year of application	Membership category: Full	Associate
L. J. Alexander	1950	X	
C. C. Allison	1950	X	
C. S. Baldwin	1953		Central Ohio Breeding Association
J. N. Baldwin	1951	X	
Natalie Barish	1951		Graduate Student
H. L. Barr	1957		Graduate Student
J. P. Beardsley	1950	X	
D. S. Bell	1950	X	
G. W. Blaydes	1950	X	
W. J. Brakel	1950	X	
W. P. Byrd	1955	X	
A. Chovnick	1951		Graduate Student
C. Cohen	1958		Battelle Staff
R. S. Davidson	1950		Battelle Staff
R. R. Davis	1950	X	
J. G. Dean	1950		Graduate Student
O. D. Diller	1950	X	
C. W. Ellett	1950	X	
F. A. Ely	1954	X	
L. A. Estel	1955	X	
H. C. Eyster	1950		Kettering Laboratory
N. S. Fechheimer	1951	X	
H. Federighi	1951		Antioch College

Table 4 (continued)

Name	Year of application	Membership category: Full	Associate
L. C. Ferguson	1950	X	
V. C. Finkner	1950	X	
C. H. Fischer	1950		Undergraduate Student
T. R. Fisher	1957	X	
P. Forsthoefel	1951		Graduate Student
A. S. Fox	1950	X	
W. Frajola	1957	X	
L. O. Gilmore	1950	X	
B. L. Goodman	1955		Graduate Student
R. M. Gove	1953		Columbus State Hospital
Martha J. Gray	1952		Graduate Student
W. D. Gray	1950	X	
E. L. Green	1950	X	
Margaret C. Green	1950	X	
W. H. Havener	1954	X	
R. A. Hefner	1954		Miami (Ohio) University
Elsie D. Helsel	1950	X	
E. T. Hibbs	1950	X	
I. C. Hoffman	1950	X	
M. S. Honeyman	1952		Graduate Student
C. D. Howell	1951		Muskingum College
H. E. Hrubant	1951		Graduate Student
P. C. Huang	1957		Graduate Student
N. P. Hudson	1950	X	
J. L. Isenberg	1950	X	

Table 4 (continued)

Name	Year of application	Membership category: Full	Associate
R. G. Jaap	1950	X	
B. F. Janson	1950	X	
F. E. Johnstone, Jr.	1950	X	
L. A. Kauffman	1950	X	
J. R. Kinzer	1950	X	
Ruth Kleinfeld	1953	X	
E. Knoder	1953		Ohio Division of Wildlife
H. B. Kriebel	1954	X	
C. A. Lamb	1950	X	
Marina H. Langlois	1957		Mrs. T. H. Langlois
T. H. Langlois	1957	X	
E. J. Lazear	1950	X	
M. A. Lessler	1954	X	
T. M. Ludwick	1950	X	
Eileen W.E. Macfarlane	1950	X	
M. G. McCartney	1955	X	
W. B. McIntosh	1956	X	
J. T. McQuate	1953		Ohio University
Louise F. Overton	1955		Graduate Student
E. F. Paddock	1950	X	
K. K. Pandey	1955	X	
Dorothy Permar	1957	X	
Dolores L. Pierson	1951	X	
H. L. Plaine	1954	X	

Table 4 (continued)

Name	Year of application	Membership category Full	Associate
D. A. Ray	1956	X	
E. L. Reynolds	1950		Antioch College
W. L. Robison	1950	X	
L. C. Saboe	1950	X	
H. G. Schlumberger	1950	X	
J. H. Smith	1957		Graduate Student
P. E. Smith	1956	X	
W. P. Spencer	1953		College of Wooster
J. N. Spuhler	1951	X	
A. G. Steinberg	1957		Western Reserve University
G. H. Stringfield	1950	X	
H. S. Teague	1953	X	
R. W. Temple	1957		Graduate Student
J. M. Thompson	1954		Graduate Student
W. M. Tidd	1950	X	
J. M. Treece	1956		Graduate Student
J. E. Tullis	1955		Graduate Student
B. B. Vance	1954		University of Dayton
W. G. Venzke	1950	X	
A. E. Waller	1950	X	
R. O. Wolf	1953		Graduate Student
C. H. Yoon	1952		Graduate Student
H. W. Young	1953		Graduate Student
Nancy K. Ziebur	1951		Artist

The first Constitution of the Institute was adopted on 7 December 1951, (which happened also to be the tenth anniversary of Pearl Harbor Day). Five years later, to the very day, a revised set of By-laws was adopted to go with an improved Constitution that had been adopted on 2 November 1956. Copies of both Constitutions are appended for those readers who may be interested in the details of their differences. There were three alterations of note: (1) Membership was made more glamorous by becoming conferrable only by the Dean of the Graduate School (rather than by the Institute's Executive Committee), (2) Appointments to committees by the Chairman became subject to review by the Executive Committee before the Chairman made them, and (3) The term of service of the Nominating Committee became year-round, so they could carry out the new responsibility of filling such vacancies as might occur on the Executive Committee.

The annual reports to the Dean of The Graduate School were published in the Graduate School Record as follows:

Report for	Volume	Number	Pages	Author
1951	4	11	5-6	C. A. Lamb
1952	6	9	9-10	D. C. Rife
1953	7	10	6-7	D. C. Rife
1954	8	10	11-12	D. C. Rife
1955	9	8	12-14	E. L. Green
1956	10	8	9-11	E. F. Paddock

The annual picnics of the Institute were always a pleasant affair. They were held as follows:

31 May 1951	Westerville City Park
23 May 1952	Scioto River Shelter House
4 June 1953	O.S.U. Golf Course
1954	?
3 June 1955	O.S.U. Golf Course
1 June 1956	Blendon Woods
31 May 1957	O.S.U. Golf Course
6 June 1958	O.S.U. Golf Course

RESEARCH GRANTS

In January 1956 the Institute of Genetics released a list of 49 research projects that were then active under the supervision of members of the institute. A copy of the list follows. In Table 5, I have listed 22 other research grants that were not included in the 1957 list because they were active either earlier or later. The four grants that are currently active total $62,830 for 1969 alone.

Table 5.

RESEARCH GRANTS (other than in the Institute 1957 list)

Agency	Supervisor	Subject	Date
National Institutes of Health	A. S. Fox	Immunogenetic Studies of Drosophila melanogaster	1949-52
Research Foundation, O.S.U.	A. S. Fox	Genetic, Chemical, and Electron Microscope Studies of Chromosomes	1952-53
U.S. Atomic Energy Commission	E. L. Green	Genetic Effects of Irradiation in Mice	1956-57
Mershon Center for Education in National Security, O.S.U.	J. B. Griffing	Support for Mershon Professorship	1965-69
U.S. Atomic Energy Commission	J. B. Griffing & S. S. Y. Young	Theoretical and Experimental Aspects of Selection as Applied to Biological Groups	1967-69
Council on Research, O.S.U.	V. L. House	Studies in Developmental Genetics in Drosophila	1959-60
Development Fund, O.S.U.	V. L. House	Modifiers Controlling Venation of the Drosophila Wing	1961-63
College of Agriculture, O.S.U.	V. L. House	Genetic Studies in Drosophila	1964-65
College of Biological Sciences	V. L. House	Gene-Environmental Interactions in Drosophila	1968-69
Council on Research, O.S.U.	W. B. McIntosh	Comparative Genetics of the Deermouse and the Laboratory Mouse	1956-58
National Science Foundation	W. B. McIntosh	Comparative Genetics of the Deermouse and the Laboratory Mouse	1959-62

Table 5 (continued)

Agency	Supervisor	Subject	Date
Development Fund, O.S.U.	Curtis, L. O. Gilmore, and D. C. Rife	Determination of the Activity of the Thyroid Gland in Cattle and Man	1952-54
Bankhead-Jones Sect.5,21, OAES	L. J. Alexander, & E. F. Paddock	Disease and Insect Resistance in the Tomato: A Breeding Project	1951-54
Hatch 72, OAES	L. J. Alexander, E. F. Paddock, R. A. Crum and R. E. Stall	The Evaulation of the Collection of Domestic and Wild Species of Tomato and the Maintenance of the Desirable Accessions and Valuable Breeding Stocks	1956
H. J. Heinz Company, OAES	L. J. Alexander & E. F. Paddock	Embryology of Interspecific Hybrids of Tomato	1956-60
National Science Foundation	H. L. Plaine	Increased Mutation Rate in a Wild Strain of Drosophila melanogaster	1955-59
National Science Foundation	H. L. Plaine	The Nature of the Induction of Uncontrolled Growths by Specific Genes in Drosophila melanogaster	1959-63
National Institutes of Health	W. C. Rothenbuhler	Genetic Analysis of Foulbrood Resistance	1963-68
National Institutes of Health	W. C. Rothenbuhler	Genetic Bases of Behavior Differences	1963-69
Development Fund, O.S.U.	D. C. Rife & E. F. Paddock	An Investigation of the Origin and Development of Chimeras	1952-56

Table 5 (Continued)

Agency	Supervisor	Subject	Date
Development Fund, O.S.U.	L. C. Saboe for the Institute of Genetics	Developing a Genetic Museum	1951-53
Ohio Seed Improvement Association	L. C. Saboe for the Institute of Genetics	Developing a Genetic Museum	1951-53

GENETICS RESEARCH PROJECTS

of

MEMBERS OF THE INSTITUTE OF GENETICS
Ohio Agricultural Experiment Station (OAES) and
The Ohio State University (OSU)

Alexander, Leonard J.: OAES, Hatch 37 -- Disease resistance in the tomato: A breeding project -- The development of disease resistance in the tomato with special reference to leaf mold, fusarium wilt, mosaic and the physiologic disease blotchy ripening, and pox.

Baldwin, Jack N.: OSU, DF 5196 -- Staphylococcal infections in infants.

_____ -- Transduction of antibiotic resistance in the Staphylococci.

Bell, D. S.: OAES, Hatch 8 -- Types of sheep and systems of breeding for market lamb production -- To determine the productive value, range of adaptation and breeding service use of F_1, three-breed cross, three-breed-rotation cross, and new breed types for commercial use in sheep production in Ohio.

_____: OAES, Hatch 34-7 -- The effect of ladino clover and birdsfoot trefoil pasture on reproductive efficiency in sheep -- To compare ladino clover and birdsfoot trefoil as principal legume for permanent sheep pasture and the effect of each on gain response, animal health, and reproductive efficiency in sheep.

_____: OAES, State 90 -- The adaptability, place and use of Columbia sheep in Ohio.

_____: OAES, State 183 -- Infant mortality among lambs -- A study of the relationship of inherent and environmental factors in the overall problem of infant mortality.

Dollinger, E. J., and G. H. Stringfield: OAES, Hatch 20 -- Studies on mutable systems in maize -- Cytogenetic studies to gain information on the nature of gene action.

_____: OAES, Hatch 20 -- Mutable systems in plant breeding -- Incorporation of a mutable system into inbred lines to induce mutation, either dominant or recessive, affecting the expression of specific characters.

_____: OAES, Hatch 20 -- Effects of neutrons on mutation in maize -- Cytogenetic studies on neutron induced mutation at specific loci in maize. An attempt to gain information on the nature of induced mutation.

Fechheimer, N. S., and L. O. Gilmore: OAES, State 309 -- Cytological investigation of dairy cattle -- To characterize quantitatively and perhaps qualitatively the chromatin of various cattle tissues, especially testes. To explore the possibility of producing heteroploid cells, organs or whole animals.

Gilmore, L. O.: OAES, Hatch 81 -- The use of cattle twins and triplets to study the relative influence of inheritance and management on efficiency of feed utilization and production -- To determine the difference in feed intake per cwt. body gain at different stages of growth between members of cattle twin pairs on the same ration as compared to the difference between the means of twin pairs. When a full sib of the same sex is available the corresponding comparison will also be made. To make comparisons similar to the above when the members of the twin pairs are placed on two different rations with respect to the ratio of concentrates and roughage. To compare the effect of three-time milking during the first lactation on the yield of the second lactation. To compare efficiency of feed utilization for different functions and study the variability of antibody response.

_____: OAES, Hatch 128-2 -- Influence of inheritance on the composition of milk -- To determine the difference between cows in the production of milk nitrogen. To determine if there is a difference in N-production between groups of paternal half sibs, that is ascribable to inheritance. Furthermore, to determine that portion of total variance represented by this inherited influence if the data are adequate.

Gilmore, L. O., N. S. Fechheimer, and E. J. Lazear: OAES, State 277 -- The inheritance of taillessness in calves and its prevalence in herds using artificial breeding service -- To determine if the tailless condition in calves is inherited, and if so, what is the nature of the inheritance. To ascertain if the condition in different breeds is caused by identical genes, i.e., parallel mutations. To find out how prevalent this gene is in bulls that have been in artificial breeding service in Ohio. To discover if possible some way of detecting carrier cattle.

Gilmore, L. O., N. S. Fechheimer, and R. G. Washburn: OAES, State 278 -- Color inheritance in cattle as it affects parentage exclusion and the detection of cattle carrying undesirable recessive genes -- To determine the specific phenotypic expressions of the more common genes affecting color markings in cattle. To determine if there are detectable differences in the surface area affected and the composition of the hair of cattle heterozygous for the commonly occurring genes. To determine if there are measurable differences between cattle homozygous for black as compared to those carrying the gene for red.

Hoffman, I. C.: OAES, State 80 -- Breeding greenhouse vegetable crops -- Breeding and selection of tomatoes, cucumbers, and other greenhouse vegetable crops for higher yields, greater uniformity in size, color and quality.

_____: OAES, State 306 -- Breeding and culture of Bibb lettuce -- To select for greater uniformity and higher yields. To study cultural conditions for best quality of the lettuce.

Jaap, R. George, and R. W. Temple: OAES, Hatch 105 -- Genetics of endocrine function in chickens -- To estimate the influence of inheritance on the variance in glands and tissues of normal and hormone-stimulated chicks at young ages.

Jaap, R. George, and Glyde Marsh: OAES, Hatch 106 -- Breeding and disease resistance with special emphases on lymphomatosis in chickens -- To develop the most feasible means of increasing the exposure of chickens to the agent or agents of lymphomatosis in order to facilitate the selection of the most resistant families for use in a breeding program.

Jaap, R. George, B. L. Goodman, and J. H. Smith: OAES, Hatch 130 -- Selection and mating methods for poultry -- To explore the use of the diallel mating system in (1) estimating genetic parameters and evaluating changes in them in unselected and selected populations, and (2) detecting comparative breeding worth of individual birds.

Klosterman, Earle W.: OAES, Hatch 113 -- Relationships between body conformation, rate of gain and carcass value as measured in a breeding herd of Hereford cattle -- To study relationships between various body measurements, rate of gain and carcass value in a herd of Hereford cattle. To correlate gross carcass measurements with detailed slaughter and carcass cut-out data. To determine the heritability of the cross-sectioned area of the longissimus-dorsi muscle. To compare the progeny of long-bodied and of compact, deep-bodied bulls as to their ability to make rapid, economical gains and produce carcasses containing a high percentage of prime cuts and edible portion. To develop a line of fast gaining, superior lean-meat producing Herefords and evaluate the methods used in this development.

_____: OAES, State 233 -- Slaughter and feeder calf production in southeastern Ohio -- Through a system of crossbreeding produce a beef-type calf of maximum weight and value for slaughter at a weaning age of nine to ten months. To produce a high-quality Hereford feeder or slaughter calf. To compare returns from these two systems.

Kriebel, Howard B.: OAES, State 286 -- Selection and breeding of forest trees -- To develop forest trees of improved qualities for wood utilization, by the application of genetics. To establish plantations for eventual large-scale production of seed from valuable selections and hybrids, for planting in farm and other woodlands.

Lamb, C. A.: OAES, State 60 -- Wheat testing and improvement -- To test new wheats from the eastern soft wheat region, and to produce new varieties adapted to Ohio by a program of crossing and selection.

_____: OAES, Hatch 14 -- The response of winter wheat varieties and strains to climatic and edaphic factors -- Includes a study of the genetic differences between wheats responsible for differences in yield and quality in different seasons and on different soils.

Lazear, Edward J.: OAES, B.J.97 -- A study of the cellular antigens in the blood of cattle -- To study the antigens on the erythrocytes, with regards to chemical nature, inheritance, and importance as related to disease and/or physiological characteristics.

_____: OAES, State 274-4 -- The physical, chemical and immunological properties of Brucellus abortus antibodies -- To measure and improve the immune response of cattle to vaccine against Bang's disease.

Lessler, Milton A.: O.S.U., RF 586 -- Cytoplasmic-nuclear relationships in tumorogenesis -- To study by cytospectrophatometric techniques the amount of DNA per nucleus and correlate this with nuclear volume mitotic activity, and cytoplasmic changes during the induction of liver tumors in rats.

_____: O.S.U., RF 513 -- Effects of low-level ionizing radiation on non-dividing cells -- To study the effects of low-level X-irradiation on post-mitotic cells with respect to cytologic and metabolic changes induced by threshold bases.

Ludwick, Thomas M.: OAES, Hatch 67 -- The effectiveness of reciprocal crossing in blending and fixing desirable characteristics of various families of Holstein-Friesian cattle -- Test value of systems of breeding in producing desired results in dairy performance. Determine values of "early criteria" in estimating future performance.

_____: OAES, Hatch 128 -- Effects of breeding and management practices on dairy herd performance -- Determine the value of "performance analysis" when used as a standard for a method of breeding and selection. Determine the relative values of numerous criteria employed to cull a herd.

_____: O.S.U., Special Project 43 -- Improvement in techniques of artificial insemination -- Develop freezing techniques

which will accommodate artificial breeding units. Determine some of the variables which influence the effectiveness of a semen diluent.

McCartney, Morley G.: OAES, Hatch 138 -- Heritabilities and genetic correlations of reproductive characters in a random bred population of turkeys -- To develop and maintain a random bred population of turkeys. To obtain estimates of genetic parameters, such as heritabilities and genetic correlations, of reproductive characters from the random bred population. To use the estimates of genetic parameters from the random bred population to evaluate the effectiveness of methods of selective breeding.

_____: OAES, Hatch 139 -- Photoperiodism as a factor in the reproduction of the turkey -- To determine the influence of day-length on production, fertility and hatchability of turkeys starting reproduction during the summer months.

_____: OAES, Hatch 140 -- Comparison of physical characteristics among strains of turkeys and their reciprocal crosses -- To determine the value of heterosis in the production of light weight roaster turkeys. To evaluate crossbreeding as a means of producing turkeys of intermediate size and conformation at mature market age. To determine the effect of crossing strains of turkeys on reproductive performance.

Macklin, Madge T.: O.S.U. -- Inheritance of human breast cancer; non-genetic factors in human breast cancer -- To determine if there are genetic factors in the appearance of human breast cancer; also to determine primarily if there is evidence for the presence of a milk agent in human breast cancer. (Ready for publication)

_____: O.S.U. -- Inheritance of human gastric cancer -- To determine if there are genetic factors in the appearance of gastric cancer in man, and if there is evidence that intestinal cancer is a separate entity, genetically.

_____: O.S.U. -- Inheritance of retinoblastoma and an estimate of its mutation rate in Ohio -- To determine (1) how many cases appearing in the population are presumably caused by mutation; (2) what is the degree of penetrance of the gene; (3) what is the empiric risk of a second or third child developing retinoblastoma, once it has appeared in a family in which parents and grandparents are normal.

Paddock, Elton F., and L. J. Alexander: OAES, Hatch 37-1 -- Cytogenetics and embryology of the domestic tomato, the wild species of tomato, and their hybrid derivatives in relation to disease resistance, hybrid sterility and self incompatibility -- Elucidate causes of difficulties encountered during efforts to improve the tomato by breeding, hoping that when the causes are understood, it will be possible to overcome the difficulties.

Ray, Dale A.: OAES, Hatch 32 -- Oat breeding and testing -- To evaluate available varieties and selections of spring and winter oats for adaptation as recommended varieties under Ohio conditions of climate and soil; to breed and select improved lines of spring and winter oats adapted to Ohio growing conditions; and to maintain and release new spring and winter oats varieties as they prove worthy of recommendation.

_____: OAES, State 61 -- Winter barley breeding and testing -- To evaluate available winter barley varieties and selections for adaptation to Ohio conditions of climate and soil; to breed and select improved winter barley varieties adapted to Ohio growing conditions; and to maintain and release new winter barley varieties as they prove worthy of recommendation.

Rife, David C.: O.S.U., DF 5603-1 -- Comparisons of the relative efficiencies of various types of training among human identical twins -- The objectives are two-fold: to shed light on the heritability of capacities to develop various skills; second, to provide controls for testing the relative efficiencies of different types of training, and the effects of different environments. (This project is an Institute, rather than an individual, project, and is administered by a committee consisting of Dr. E. F. Paddock, Dr. John Kinzer, and David C. Rife, chairman.)

Schlumberger, H.: O.S.U. -- Neoplasia in the parakeet -- A study of hormonal changes accompanying a transplantable pituitary carcinoma in these birds. Study for virus etiology of spontaneous and transplantable fibrosarcomas.

Smith, P. E.: OAES, Hatch 46 -- Development and evaluation of improved varieties of soybeans for farm and industrial utilization -- To develop by introduction, hybridization and selection improved strains of soybeans especially adapted to Ohio. To cooperate through the U.S. Regional Soybean Laboratory in the inter-state programs of exchange and evaluation of basic breeding, stocks, segregating populations, and promising new strains originating from the breeding programs of all the cooperating states. To make genetic studies as it may effect methods of breeding and field plot technique. To assist in an orderly, effective program of increased and early distribution of foundation seed of new improved strains. In cooperation with the department of botany, to evaluate the breeding material to existing varieties in regard to their reaction to soybean diseases prevalent in Ohio. Also to aid in the study of the various diseases per se as well as methods of control

Stringfield, G. H.: OAES, State 12 (EC a2-1) -- Development of improved methods of breeding corn -- Currently: Study of segregation for genes contributing to grain yield from S_0 to S_3 generations; an improved design for field performance trials; the effect of "sterile" cytoplasm on plant vigor; and to evaluate the usefulness of seed size as an index of zygotic vigor.

_____: OAES, Hatch 102 (EC a2-2) -- Effect of weather, cultural practices and nutrition on growth, development, yield, and quality of corn -- Cooperating with Dr. J. L. Haynes studying the relations of plant (corn) distribution on the performance of the corn itself and on interseedings in the corn. Study of individual plants to isolate the ontological events most closely associated with final plant yield.

_____: OAES, Hatch 20 (EC a2-4) -- Development and seed increase of productive (corn) hybrids for the corn belt including the comparison of promising hybrids in performance trials -- To isolate superior inbred lines, especially improvements on existing lines. To identify ecological relations of inbreds with special reference to insects, diseases, birds, heavy stands. Comparison of double cross versus polycross. To make and evaluate superior commercial hybrids. Incorporating male sterility and restorer genes in useful and possibly useful inbreds.

Teague, Howard S.: OAES, Hatch 42 -- Grade or pure breeding, and rotation cross breeding for the production of market hogs -- To compare the performance and killing qualities of purebred Durocs, Yorkshires, Berkshires and Beltsville No. 1's with two types of rotation cross-breds, one of which is produced by using Duroc, Yorkshire and either Poland China or Beltsville No. 1 sires in turn on successive generations of dams selected from the group, and the other of which is produced by using sires of Beltsville No. 1, of a colored line being started from crosses of Yorkshires and Durocs and of an inbred Berkshire line in turn on successive generations of dams selected from this group. To outcross and re-inbreed an Ohio Duroc line of some promise. To maintain a good performing and good killing strain of Berkshires through inbreeding.

_____: OAES, State 271 -- The nutritive value of cured or dehydrated legumes in the dry lot breeding and gestation diet for swine -- To further determine the nutritive value of dehydrated or cured legumes in the breeding and gestation ration for swine. To determine the nature of the physiological response, relative to female reproductive performance, affected by the consumption of legumes. To study ways of supplying the nutrient factors furnished by legumes to breeding and gestation diets containing no green forage material.

_____: OAES, State 300 -- A generation study of the adequacy of all-plant diets for the growth and reproduction of female swine confined to dry lot -- Under continuous dry lot conditions, to determine the adequacy of all-plant compared to plant and animal diets for the growth and subsequent reproductive performance of female swine and their progeny.

Three Wheelhorses

I arbitrarily limit myself to a choice of the three persons who in my opinion did the most to put genetics on the map during the first 100 years of the university's history. Foremost of the three is Dr. Laurence H. Snyder. He received a B.S. degree in 1922 at Rutgers University, an M.S. in 1924 and a D.Sc. in 1926, both from Harvard. He then served as Instructor, Assistant Professor and Associate Professor at North Carolina State College before coming to the Ohio State University as an Associate Professor in 1930. In cooperation with Dr. Barrows, he changed the introductory course to an even greater emphasis on genetics, brought in the use of living materials, and greatly popularized the course. His attractive personality quickly brought a group of graduate students. The fact that his field of special interest lay in human and medical genetics in itself automatically attracted students. He published many papers in scientific journals and several books. One book is "Principles of Heredity" which today (in 5th edition) is still one of the most widely used textbooks on the subject. He was Editor of the Ohio Journal of Science for 9 years (1933-41, inclusive). Combined with two years by E. L. Green (1951-53) and 6 years by H. L. Plaine (1956-62), 18 years of the 69 that that journal has been published were edited by an Ohio State University geneticist. Also, in those 69 years, there have been only 7 other editors. Snyder was on the Editorial Board of the Journal of Heredity for two years (1949-51) and during the second of those years was also on the Council of that journal which post he held through 1959.

Snyder was active in several scientific societies and held the following offices: Vice President of the American Naturalist Society, 1941; Vice President of the American Society of Zoologists, 1943; President of the Genetics Society of America, 1948; President of the American Society of Human Genetics, 1950; and President of the American Association for the Advancement of Science, 1958. He was the recipient of three honorary degrees: the D.Sc. from Rutgers University in 1941, the D.Sc. from Ohio State University in 1960, and the L.H.D. from North Carolina State College in 1962. In 1942 he became the fifth chairman of our Department of Zoology and Entomology. After five years he resigned in 1947 to accept the position of Dean of the Graduate School at the University of Oklahoma. Ten years later he resigned that position to become President of the University of Hawaii. He retired from that presidency in 1963, and continues to make his home in Hawaii.

Not having known Professors Barrows or Schaffner, I place Dr. David C. Rife in the position of second most influential person in the development of genetics at the Ohio State University. He grew up on a farm in Green County, Ohio and went to near-by Cedarville College where he received the B.S. degree in 1922. One year later he received the B.Sc. in Agriculture from Ohio State, then back to the farm for four years. He was a large and vigorous man who I am sure could really "put out" in farm work. From 1927 to 1930 he was Instructor in Science and Agriculture in a mission school at Khartoum in the Anglo-Egyptian Sudan. He has

told me that on his return stateside he was of a mind to enter graduate study in agronomy. But he fell under the influence of the Snyder personality and received the M.A. in 1931 and the Ph.D. under Snyder in 1933. From February to August in 1934 he was Educational Adviser in the Civilian Conservation Corps, then became an Instructor in Zoology at Ohio State University. He rose through the ranks to full Professor by 1945. He subsequently held two Fullbright Professorships. In the Winter Quarter of 1946, I received my baptism into teaching by auditing his teaching of the 9:00 A.M. section of Zoology 403, having an hour to mull it over, then meeting the first of my own two daily sections. From as early as 1938 until he resigned in July 1958 to join the Department of State he was actively engaged in research on the genetics of Coleus. From 1955 to 1958 he was Secretary of the American Society of Human Genetics. He retired in 1966, took up residence in Florida, and is now on the staff of the University of Florida at Gainesville. He was on the Council of the Journal of Heredity from 1965 through 1968. Besides numerous papers published in scientific journals, he published three books: "Dice of Destiny" and "Introduction to Heredity and Racial Variations" in 1945, "Heredity and Human Nature" in 1959, and "Hybrids" in 1965. The books alone reflect the fact that despite a significant career in the area of genetics of normal (as opposed to medical) variation in man, he continued to be interested and effective in the applications of genetics to agriculture.

In third place, I put Dr. Earl L. Green. He had received the Ph.D. in 1940 at Brown University and spent a year as a post-doctoral scholar at the University of Chicago under Sewall Wright. Dr. Green had received the B.S. in 1935 from Allegheney College right in his home town. In 1937 he received the Sc.M., followed by the Ph.D. in genetics in 1940, both from Brown University. After two years at Ohio State he joined the United States Army Air Force as a second lieutenant, emerging three years later in the rank of Captain and resuming his post here in the rank of Associate Professor. In 1953-55 he was on leave to the Atomic Energy Commission. His research interests lay with quantitative and physiological genetics, with the mouse as the experimental organism of choice. His wife, Dr. Margaret Creighton Green, was also very active in mouse genetics research. She was appointed in 1946-47 to teach in the general zoology course. In 1952 she won the Sigma Delta Epsilon national award for the best research paper published by a member in the previous year. Earl resigned in 1956 to become Director of the Roscoe B. Jackson Memorial Laboratory in Bar Harbor, Maine, a post he still holds. This laboratory is world famous for its research on cancer, performed mostly on highly inbred strains of mice. He published one book, "Biology of the Laboratory Mouse" in 1966. He was Editor of the Ohio Journal of Science for 2 years (1951-53), and Editor for the Animal Genetics Section of Biological Abstracts from 1949 to 1956. He was on the Editorial Board of the Journal of Heredity from 1954 to 1962 and on the Council of that journal from 1954 to 1967. For a few years including 1956 he was on the Editorial Board of GROWTH.

The Muellhaupt Scholarship

This scholarship in its earlier years was awarded for post-doctoral work by the Ohio State University. During this time it was awarded twice to geneticists. I was the first such, and held the scholarship in 1941-42 with a renewal for 1942-43. My intended research was a continuation of my Ph.D. thesis research on polyploidy in the Solanum nigrum complex of species. But on 7 December 1941, Pearl Harbor occurred so I switched to an investigation of chromosomes in Hevea braziliensis as a more worthy contribution to the war effort, that species being then the primary source of all the world's supply of rubber.

In 1950-51, and with a renewal for 1951-52, Dr. Dolores Lehman Pierson held the Muellhaupt Scholarship. She did research on the genetics of spotting patterns in wings of a genus of butterflies.

The Mershon Professorship

This distinguished professorship was conceived and proposed by Dr. George W. Wharton, Chairman of the Department of Zoology and Entomology. Through 1969, the Mershon Center for Education in National Security has supported this professorship with $95,000. In 1965, Dr. J. Bruce Griffing was appointed to the post. Dr. Griffing is now also Chairman of the Academic Faculty of Genetics. He earned three degrees at Iowa State University: the B.S. in 1941, the M.S. in 1947, and the Ph.D. in 1948. He has held three fellowships: the Roosevelt Fellowship in 1941 at the University of San Marcos in Lima, Peru; the Chilean Pan-American Fellowship

in 1942 at the University of Santiago in Santiago, Chile; and a National Research Council Postdoctoral Fellowship in 1954-55 (to study with Sir Ronald A. Fisher) at Cambridge University, England. Upon completing the Ph.D., he stayed on at Iowa as an Assistant Professor in the Genetics Department until going to England. From the study with Sir Ronald, he went to Australia as a Research Officer, then as a Research Scientist, and, in his last 5 years there before coming to Ohio, as Senior Principal Research Scientist, all in the Commonwealth Scientific and Industrial Research Organization. Dr. Griffing has published over 30 papers in scientific journals since 1950. Dr. Griffing's research interests have centered on the mathematical theory of transmissional genetics and the mathematical aspects of quantitative inheritance and selection theory relative to population genetics. Since 1967, Dr. Griffing has been awarded $57,000 in grants from the United States Atomic Energy Commission.

The Academic Faculty

With hindsight it can now be discerned that the Academic Faculty of Genetics came out of the ferment that led to a recommendation by President Fawcett, and its approval on 1 July 1966 by the Board of Trustees, to form a College of Biological Sciences. The new college began with five departments or divisions: Biochemistry, Biophysics, Botany, Microbiology, and Zoology and Entomology. The plant pathology portion of the former Department of Botany and Plant Pathology remained in the College of Agriculture.

Dr. Ralph H. Johnson, a biochemist, Director of the Institute of Nutrition and Food Technology (which had been the most vigorous of the campus institutes), was appointed Dean of the new college.

But the fermentive process was not yet over. Dean Johnson had ideas on how to escape from the administrative rigidities that had interfered with interdepartmental programs and which had kept the institutes from flourishing. Under his prodding, the faculty made studies, and the following action was taken on 20 October 1967: "Be it resolved that on January 1, 1968, the College Faculty, acting in accordance with University Rule 23.03, abolish the four departments and one division of the College of Biological Sciences, and that the new basic units (Academic Faculties) for instruction, research and extension in a defined field of learning be established at that time, in such numbers as is necessary to meet the needs of, and to serve at the discretion of the College Faculty." The proposal for an Academic Faculty of Genetics was approved at the College of Biological Sciences Faculty meeting of 4 December 1967. Five other proposed Academic Faculties were also approved in that meeting.

The Department of Biochemistry and the Division of Biophysics experienced little more than a change in name to "Academic Faculty of . . .". The Department of Microbiology became the Academic Faculty of Microbial and Cellular Biology. This was a change in name plus a new orientation for a few individual faculty members. But the other two departments: Botany, and Zoology and Entomology were torn asunder and their faculty members forced to choose among four academic faculties.

Entomology and genetics had for many years been recognizable as "subdepartments" in the Department of Zoology and Entomology. Each had a functionally coherent faculty and a coordinated program of courses and activities. The balance of faculty members in the two departments having been given their free choice, became thoroughly scrambled between the "Organismic and Developmental Biology" and "Population and Environmental Biology" academic faculties.

The steam was up and ready in the Academic Faculty of Genetics. It had its first official faculty meeting on 5 January 1968, three days before Dean Johnson wrote his letter appointing Professors Byers, Harvey, House (to be chairman of the committee), Paddock, and Young to search for a chairman of the academic faculty. This committee, on 5 February 1968, reported its unanimous and strong recommendation that Dr. J. Bruce Griffing be appointed, and Dean Johnson made the appointment.

The "charter" members of the Academic Faculty of Genetics were:

Name	Year	Appointment		
		Full-time	Part-time	Courtesy
Byers, Thomas J.	1964			X
Essman, Robert H.	1962	X		
Griffing, J. Bruce	1965	X		
Harvey, Walter R.	1964			X
House, Verl L.	1958	X		
Paddock, Elton F.	1946	X		
Plaine, Henry L.	1954	X*		
Rothenbuhler, Walter C.	1962			X
Skavaril, Russell V.	1964	X		
Weaver, C. Richard	1952		X	
Young, Sydney S. Y.	1967	X		

* In spring of 1969, Dr. Plaine was appointed Assistant Dean in the College of Biological Sciences.

Other members of the university faculty who have subsequently achieved membership in the Academic Faculty of Genetics are:

Name	Year	Appointment		
		Full-time	Part-time	Courtesy
Allaire, Francis R.	1966			X
Aubele, Audrey M.	March, 1968 (also Sept.-Dec., 1966)			X
Clay, Roger E.	Oct., 1968	X		
Fechheimer, Nathan S.	1952			X
Jaap, R. George	1946			X
Kriebel, Howard B.	1953			X
Swiger, Louis A.	1965			X

In October 1969, acceptance of appointment to begin in Autumn, 1970 as Associate Professor of Genetics was received from Dr. Carl W. Birky of the University of California at Berkeley.

On 8 November 1969, the Graduate Council approved the proposal of the Academic Faculty of Genetics for a Graduate Program in Genetics.

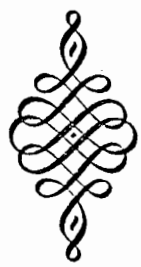
APPENDIX

The

INSTITUTE of GENETICS

of

THE OHIO STATE UNIVERSITY



1950

OFFICERS AND EXECUTIVE COMMITTEE

D. C. Rife, *Chairman*

R. G. Jaap, *Vice-Chairman*

L. C. Ferguson, *Secretary-Treasurer*

L. C. Saboe

J. N. Spuhler

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Research and Publications Committee

L. O. Gilmore, *Chairman*

F. E. Johnstone, Jr.

H. G. Schlumberger

Program Committee

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A. S. Fox

Curriculum Committee

E. L. Green, *Chairman*

W. D. Gray

J. C. Kinzer

Office of the Chairman
325 Botany and Zoology Building
The Ohio State University
Columbus 10, Ohio

ESTABLISHMENT OF THE INSTITUTE OF GENETICS

(Reprinted from THE GRADUATE SCHOOL RECORD, August 1950)

On recommendation of the Graduate Council, the University Administration in May 1950 authorized the establishment of an Institute of Genetics under the aegis of the Graduate School. The formal organization of members of the faculty interested in the various aspects of genetics is the recognition of an important subject of research and instruction actively carried on in numerous departments of the University. Genetics as a science dealing with the heritable characters of living things has become a fundamental subject for research and application in biology, medicine, agriculture, and sociology.

The establishment of the Institute is not only the result of the significant and extensive interest in the science of genetics itself, but is also the outgrowth of many years of research and teaching on the campus and at the Ohio Agricultural Experiment Station. In a more limited but nonetheless significant fashion, the formation of an Institute of Genetics is the culmination of a group interest in the subject beginning in 1934. Since that date, a weekly seminar in genetics has been held in the Department of Zoology and Entomology, attended by faculty members and graduate students from a dozen or more departments of instruction in five colleges and the Experiment Station.

Throughout the history of the genetics seminar the motivation has been the voluntary association of faculty and students interested and working in one or another of the numerous aspects of genetics. The Institute is expected to perpetuate this association of interest, to gain the advantages of formal recognition through organization, and to extend its activities and influence.

In addition to fostering research and seminar activities in genetics, the University has increasingly offered courses in the subject at college and graduate levels. Whether labelled as a course in genetics or included as a principle in the teaching of other courses, the subject has been presented where pertinent by members of the faculty alert to the significance of heredity in its many manifestations. Through teaching and research in genetics, scholars formerly and now on the faculty have brought distinction to themselves and the University.

Thus the purposes in establishing the Institute of Genetics are to recognize formally the interest and to promote the activities of the University and Experiment Station in the subject, and to facilitate and encourage the voluntary association of the members of the faculty and staff who are concerned with this basic field of science.

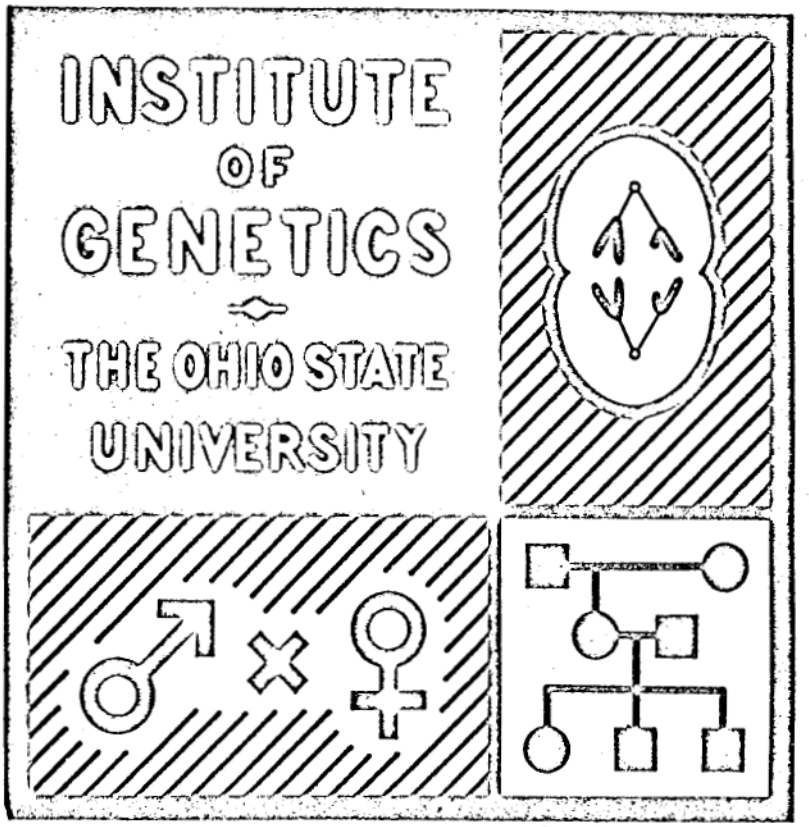
The organization of the Institute is designed to facilitate the conduct of its program. The active members are those members of the University faculty and of the staff of the Experiment Station who voluntarily become associated with the activities of the organization. Persons interested in genetics, who are in the community and not with the University or Experiment Station, may be elected to associate membership. The governing body is made up of an Executive Committee consisting of six members, two of whom are elected by the active members annually, after receiving the report of a nominating committee which presents two names for each position to be filled. The officers of the Institute are a Chairman, Vice-Chairman and Secretary-Treasurer, who are elected by the Executive Committee from its own membership, each serving a term of one year as officer. Committees authorized by the Executive Committee are appointed by the Chairman to serve appropriate terms of office. The Chairman of the Institute reports the plans and activities of the Institute to the Dean and Graduate Council of the Graduate School.

The organization temporarily set up for the initiation of the Institute's activities is: Professor D. C. Rife (Zoology and Entomology), Chairman; Professor R. G. Jaap (Poultry Husbandry), Vice-Chairman; Professor L. C. Ferguson (Bacteriology), Secretary-Treasurer; and as two other members of the Executive Committee, Professor L. C. Saboe (Agronomy), and Professor J. N. Spuhler (Sociology). The committees now active are the Research and Publications Committee (Professor L. O. Gilmore, Dairy Husbandry, Chairman); the Program Committee (Professor E. F. Paddock, Botany and Plant Pathology, Chairman); and the Curriculum Committee (Professor E. L. Green, Zoology and Entomology, Chairman). Members of the Institute belong to the departments of Agronomy, Animal Science (Experiment Station), Bacteriology, Botany and Plant Pathology, Dairy Husbandry, Horticulture and Forestry, Medicine, Pathology, Poultry Husbandry, Psychology, Sociology (Anthropology), Veterinary Preventive Medicine, and Zoology and Entomology.

The activities of the Institute are to perpetuate the group interest in genetics, consistent with the growing importance and extension of knowledge of the subject. The Institute will continue to coordinate the instructional programs in genetics in the several departments and colleges of the University, at the undergraduate and graduate levels. Research programs, especially of interdepartmental nature, will be encouraged and coordinated, and assistance will be given when requested in the procurement of funds from outside agencies for the support of research. The seminar in genetics is to be continued. The Institute includes the arrangement of special symposia and lectures among its planned activities, and will lend its advice for the improvement of library holdings in the various fields of genetics.

The establishment of an Institute of Genetics is evidence of the importance of the subject as a science and of its interdepartmental nature in research and teaching. A voluntary association of faculty and staff members concerned with genetics will promote the science in the University and Experiment Station and bring recognition of activities in this field.

N. Paul Hudson, *Dean*


INSTITUTE
OF
GENETICS
THE OHIO STATE
UNIVERSITY

THE INSTITUTE OF GENETICS

THE GRADUATE SCHOOL
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO
1954

THE INSTITUTE OF GENETICS

1954

EXECUTIVE COMMITTEE

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MUSEUM COMMITTEE

Lewis C. Saboe, *Chairman*
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Elsie G. Helsel

FOREWORD

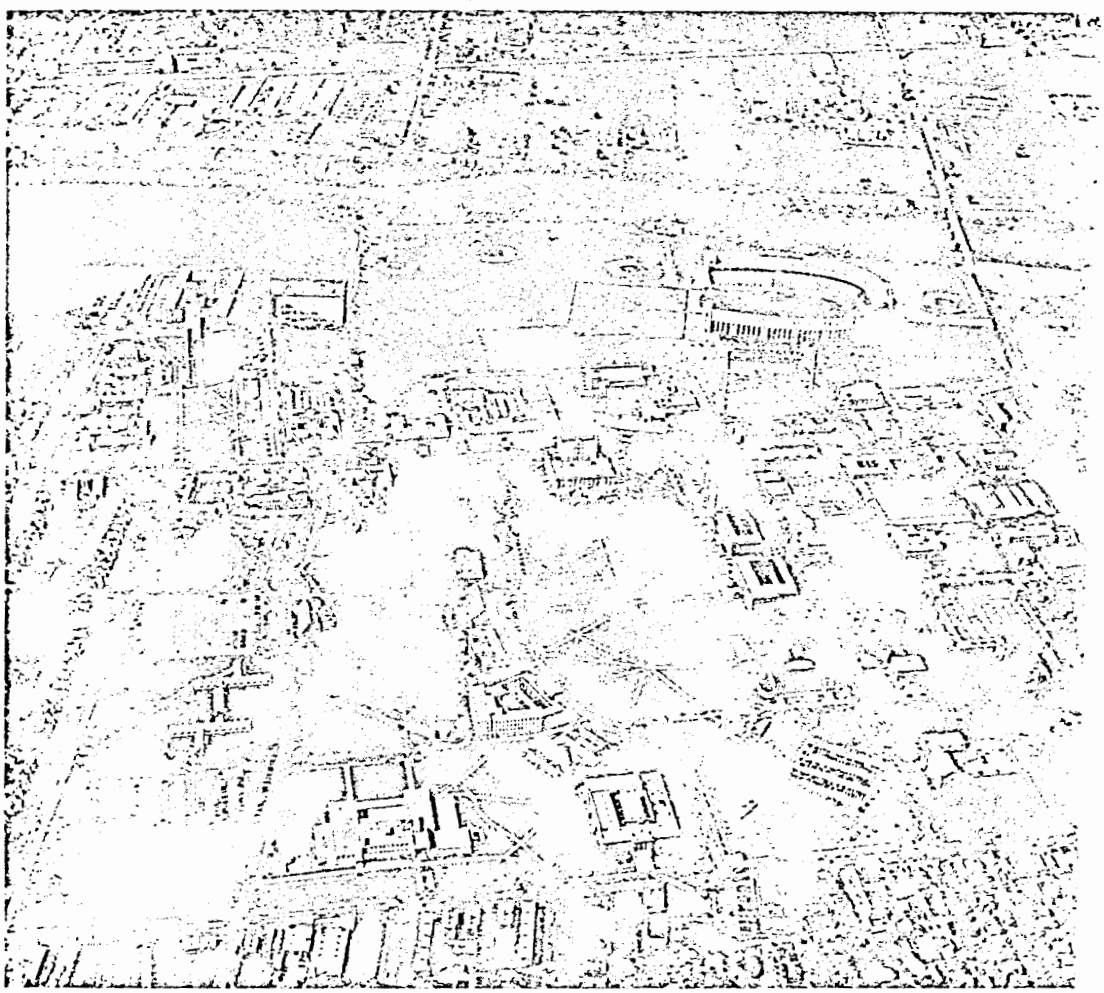
The Institute of Genetics, as one of several similar organizations of the Graduate School, is composed of members of the faculty active in this particularly important and complex field of study. While genetics has developed as a natural and complex science, it is also true that common principles governing the various areas of application have been established at the same time. In these respects, the Institute of Genetics is similar to the other institutes of the Graduate School.

The Institute of Genetics brings together, on a voluntary basis, the members of the faculty interested in emphasizing the common principles underlying teaching and research in genetics, without respect to the field of application or administrative location. In common with other institutes of the Graduate School, the Institute of Genetics has five general objectives: to promote cooperative research, especially of an interdepartmental nature; to organize and integrate instructional programs at both the undergraduate and graduate levels; to arrange special symposia and lectures in the field; to seek and receive funds from non-University sources through existing administrative offices of the University, and to encourage the publication of the results of research.

Within this academic framework, the Institute of Genetics conducts its program of interdepartmental and intercollege activities. It has grown out of a long-established seminar in genetics and as a reflection of the common interests in the genetics of man, plants and lower animals.

The Institute of Genetics is realizing the advantages of interdepartmental association and is serving the University and higher education by promoting the program of genetics instruction and research on the campus and at the Ohio Agricultural Experiment Station. In the succeeding pages this Graduate School program in genetics is described.

N. Paul Hudson
Dean of the Graduate School



THE MAIN CAMPUS OF THE OHIO STATE UNIVERSITY

THE SOCIAL IMPACT OF GENETICS

Genetics occupies a unique position among the biological sciences. The same fundamental principles of heredity operate in plants and animals, including man. Thus geneticists and breeders, regardless of the type of organism they may be concerned with, speak the same professional language. The broad applications of the principles of genetics have doubtless been partially responsible for the rapid growth of the science.

Genetics has already made and will continue to make notable contributions to social welfare. The introduction of hybrid seed corn is responsible for an annual increase of a quarter of a billion bushels of corn in the United States. The widespread use of artificial insemination has greatly accelerated the production of superior germ plasm in livestock, especially in dairy cattle. Superior hybrid strains of chickens, livestock, and various agronomic and horticultural crops are being introduced. These advances should do much temporarily to relieve food shortages in overpopulated regions of the world.

Research in human genetics is contributing greatly to our understanding of the role of heredity in abnormalities and diseases, both physical and mental. It has provided the legal profession with valuable criteria for establishing identity and parent-child relationships. Similar genetic criteria enable anthropologists and political scientists to estimate the comparative degree of relationships between ethnic groups. Modern genetics has provided techniques by which psychologists and educators may evaluate the relative importance of heredity and environment and their interactions in the development of abilities and personality traits.

Even more significant than the foregoing, modern genetics has given us insight into the biological basis of human nature. We are better equipped to understand and evaluate individual and group differences. This is of paramount importance in our highly integrated modern world where somehow we must learn to get along together.

THE ORGANIZATION OF THE INSTITUTE OF GENETICS

On recommendation of the Graduate Council, the University administration in May 1950 authorized the establishment of an Institute of Genetics under the aegis of the Graduate School. The purposes of establishing the Institute of Genetics were to recognize formally the interest in genetics and to promote the activities of the University and the Ohio Agricultural Experiment Station in the subject, and to facilitate and encourage the voluntary association of the members of the faculty and staff who are concerned with this basic field of science.

The active participants are those members of the University faculty and the staff of the Experiment Station who associate themselves with the activities of the organization. Students in the Graduate School and persons

interested in genetics who are residents of Ohio and not associated with the University or Experiment Station may be elected to associate membership. The governing body is made up of an Executive Committee consisting of six members, two of whom are elected by the active members annually, after receiving the report of the nominating committee which presents two names for each position to be filled. The officers of the Institute are a Chairman, Vice Chairman and Secretary-Treasurer, who are elected by the Executive Committee from its own membership, each serving a term of one year. Committees authorized by the Executive Committee are appointed by the Chairman to serve appropriate terms of office. The Chairman of the Institute reports the plans and activities of the Institute to the Dean of the Graduate School and the Graduate Council.

THE SEMINAR PROGRAM

Since 1935, the seminar in genetics has met each Friday at 4:00 P. M. during the academic year, and thus considerably antedates the Institute as such. It was the first organizational evidence of the desire for a common meeting ground among personnel of The Ohio State University having an interest in genetics. Attendance at the meetings, which are always open to the entire academic staff and student body, now averages from 25 to 30.

Speakers from other educational institutions in Ohio frequently participate in the meetings. Among these have been Eileen MacFarlane of Institutum Divi Thomae, Maxwell Power of Kenyon College, Earl Reynolds of the Fels Foundation at Antioch College, H. Clyde Eyster of the Kettering Foundation, and Warren Spencer of Wooster College.

Once each Quarter the Graduate School joins with the Institute in bringing to the campus an outstanding scholar in the field of genetics. Among others, there have been Leslie C. Dunn of Columbia University, Lawrence Snyder of the University of Oklahoma and Tobias C. Carter of the University of Edinburgh. Occasionally, the Institute associates with other campus organizations in sponsoring a speaker. For example, Edward D. Delameter of the University of Pennsylvania and Joshua Lederberg of the University of Wisconsin have been sponsored with the Department of Bacteriology, while Curt Stern of the University of California was sponsored with the local chapter of Sigma Xi. Once each Quarter the seminar meets at the Ohio Agricultural Experiment Station in Wooster, Ohio, in cooperation with the geneticists at Wooster College.

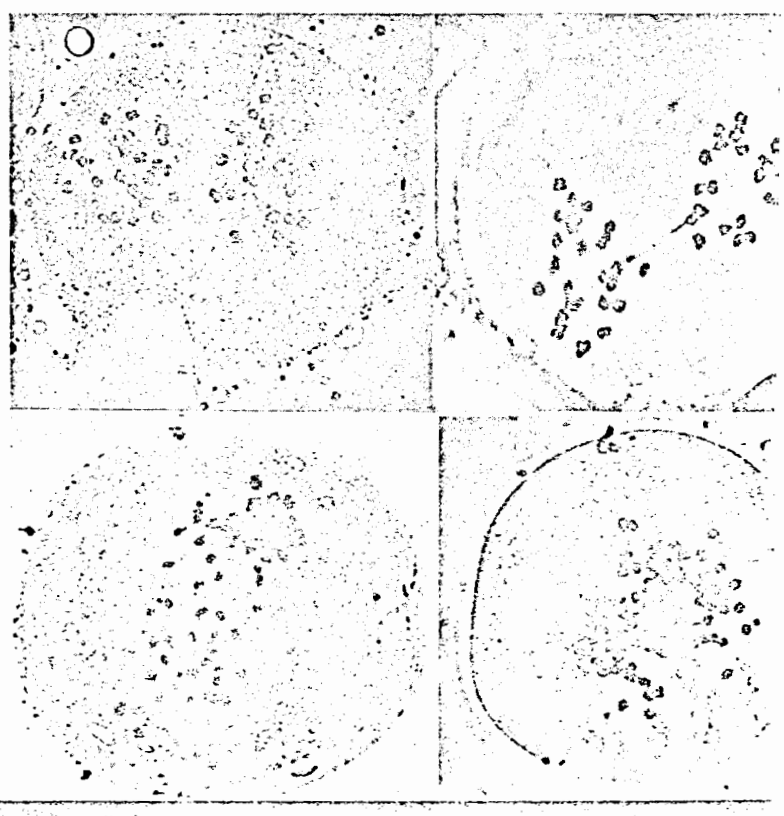
THE CURRICULA FOR UNDERGRADUATE AND GRADUATE STUDENTS

Two curricula in genetics have been outlined for undergraduates: one for students enrolled in the College of Arts and Sciences and one for those in the College of Agriculture. Details of these curricula are given in the

bulletins of the respective colleges. In general, the curricula consists of 30 Quarter hours of botany and zoology, including elementary genetics, 20 or more hours of chemistry, 10 or more hours of physics, 25 or more hours of mathematics, with the remaining hours devoted to English, foreign languages, social sciences and elective courses. The curricula are suggested for those students planning a career in theoretical genetics. Students wishing to specialize in applied genetics ordinarily pursue one of several departmental curricula with planned genetic options.

For graduate students, each department authorized to grant advanced degrees with specialization in genetics has its own set of requirements in addition to those of the Graduate School. The departments include Agronomy, Dairy Science and Poultry Science. Because of the individual nature of graduate programs there is considerable flexibility in departmental requirements. Almost all graduate students specializing in genetics take courses in Fundamental Genetics, Cytogenetics, Physiological Genetics, Population Genetics and Human Genetics in addition to the courses directly concerned with their area of interest within genetics. A seminar, open to advanced graduate students, is devoted to topics of current general interest in genetics.

In the area of genetics the constancy of chromosomal behavior has been established in both animals and plants. Meiotic divisions of the chromosomes of coleus, a common ornamental house plant illustrated below, occur preparatory to the formation of germ cells. Diploid (upper left), diploid + I (upper right), triploid (lower left) and tetraploid (lower right).



THE AREAS OF RESEARCH

The following areas of research are under active research by members of the Institute of Genetics:

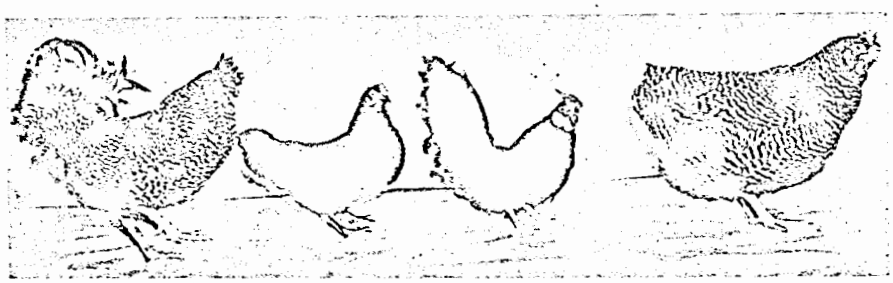
FORMAL GENETICS

Mouse. As departures from "normal" are observed, they are tested for their possible genetic basis. Two genes and a third new hereditary condition have thus been discovered. A new limb and foot abnormality, called "luxoid," has been found by Margaret C. Green. It is phenotypically like "luxate," but appears to be genetically distinct. A new Mendelian recessive *"furless"* gene was found to be genetically distinct from "hairless" and "naked" by Earl L. Green. A tail abnormality was discovered by Margaret A. Maurer.

Poultry. Two new sex-linked genes in the domestic fowl have recently been identified and studied by Edward F. Godfrey and R. George Jaap. One gene is concerned with body size and the other with a semilethal condition.

The effects of the sex-linked body-size gene were first observed in crosses between Rose Comb Black Bantams (1.2 pounds) and Barred Plymouth Rocks (6.5 pounds) using barring, silver and rapid feathering, three sex-linked markers. This gene, a dominant, was found to add nearly 0.5 pound to the body weight of the bird at maturity.

The second sex-linked recessive gene causes a "jittery" condition in a newly hatched chick. The affected chicks exhibit a twisted neck, a distinct muscular incoordination and sometimes a rapid shaking of the head. Linkage results indicate that the sex chromosome linkage group is twice as long as previously suggested.



These fowls were used in an experiment designed to determine the inheritance of size differences between Barred Plymouth Rocks and Rose Comb Black Bantams. The two chickens on the left were produced by crossing the two on the right.

A new autosomal recessive albinism in the turkey is being studied by Earl More at the Ohio Agricultural Experiment Station in Wooster. This differs from the sex-linked incomplete albinism previously reported for the turkey.

The pilgrim "characteristic" in geese which causes the male to have white and the female gray plumage is the subject of a genetic analysis by R. George Jaap and Everett L. Dakan.

TOMATO. Three aspects are being concentrated upon. One is the linkage relationship of known Mendelian genes governing resistance. The second concerns itself with the embryology of interspecific hybridizations, and the third deals with the transfer of hereditary disease resistance from wild species into commercially acceptable varieties. This project is under the supervision of Elton F. Paddock.

COLEUS. An investigation of the genetics of leaf color and shape, male sterility and polyploidy in coleus is being conducted by David C. Rife. Thirty genes at thirteen loci have been identified and autopolyploids of known genotypes have been synthesized. Nallari S. Reddy has recently made chromosome counts of various varieties and species.

CHIMERAS. A genetic analysis of chimeras in tomatoes, coleus, sanseveria and other plants is being carried out by Glenn W. Blaydes, David C. Rife, Elton F. Paddock and Nancy Ziebur.

One of the plants used in investigating the nature and cause of chimeras is Coleus. Here illustrated is a Coleus having an albino leaf shoot.

IMMUNOGENETICS

CATTLE. Research on the cellular antigens in cattle blood and its applications to the blood typing for the various breed-recording associations is under investigation by Lloyd C. Ferguson, Edward J. Lazear, Robert A. Elliot and others. This research includes immunologic techniques and genetic analysis of the resulting data. Quantitative studies have improved the procedures for the preparation of serum reagents and the routine hemolytic test.

Chemical fractionation of the red blood cells has revealed that some of the known antigens are of a complex carbohydrate structure which acts immunologically like a hapten. This fraction will combine specifically with antiserum but it is not antigenic.

Bovine spermatozoa have been found to contain the antigens which are present in the red blood cells of the same animals. Tests designed to detect any association between the cellular antigens and other simply inherited characters of cattle, such as the dwarf condition, are in progress. Cattle being studied in the Regional Dairy Cattle Breeding Project in the North-Central states are all blood typed and complete records of production, type classification and other detailed observations are being recorded.

DROSOPHILA MELANOGASTER. A comparison of the antigenic specifiicities of the proteins present in flies possessing known genetic differences is being made. Three series of investigations are currently in progress under the direction of Allen S. Fox, with assistance of graduate students. The investigation covers: 1) the antigenic effects of ten euchromatic loci, 2) the antigenic effects of the heterochromatic Y chromosome, and 3) the role of pseudalleles and position effect in the determination of antigenic specificity, utilizing the lozenge series.

PHYSIOLOGICAL GENETICS

DROSOPHILA. Physiological genetics is concerned with the intrinsic properties of genes, including problems of gene composition and structure, reproduction and mutation. At a different level there are the extrinsic problems of genes as physiological agents, manifesting their activities in conjunction with cytoplasmic and environmental influences, controlling the processes of metabolism and the events of differentiation and morphogenesis.

Chromosome investigation using the electron microscope and chemical methods are being conducted by Allen S. Fox, Quentin Van Winkle, Albert F. Prebus and their respective students. Two objectives are: 1) a study of the ultrastructure and chemical composition of interphase and mitotic chromosomes by means of combined electronmicroscopy and chemical treatment, and 2) a study of the ultrastructure of the salivary chromosomes of *Drosophila melanogaster*, including the association of ultrastructure with banding

seen with visible and phasecontrast microscopy, and the association of ultrastructure with genetic activity.

NEUROSPORA CRASSA. An investigation is being conducted by Allen S. Fox to test the suggestion that antibodies are capable of inducing mutations of specific genes, a property not exhibited by any other known mutagenic agent. Attention is being directed to the induction of mutations of the inositolless and sulfanilamide-resistance loci by means of specific antisera produced in rabbits.

Genetic control of the synthesis and specificity of enzymes constitutes a second approach to the problems of the genetic control of proteins. Current attention is being placed on the quantitative and qualitative aspects of the effects of genetic and environmental factors on the synthesis of the enzyme tyrosinase.

HUMAN BREAST CANCER

This project is sponsored by the American Public Health Services, Cancer Control Division, and is directed by Madge T. Macklin, Research Associate in the College of Medicine. Extensive pedigree information for the analysis of the incidence and the age of onset of breast cancer is being collected. The roles of certain extrinsic factors, such as the number of children and the extent of nursing, are included in this study.

POPULATION GENETICS

MOUSE AND DROSOPHILA. Two studies in population genetics are in progress. One by H. Everett Hrubant involves the genetic analysis of the red and gray color phases of the Eastern Screech Owl; the other by Louise F. Overton is an investigation of the genetics of insecticide resistance in selected stocks in *Drosophila melanogaster.*

HUMAN. The genetics of common nonpathological variations and their frequencies within different populations is being investigated by David C. Rife, Phillip Matlock and Charles Pemberton. Over a period of years data have been collected which include the hand prints, the ABO blood groups, M and N blood types, stature, weight, head length and breadth, handedness, ear lobes, features and pain threshold of more than 3300 university students.

During the past year, while serving as a Fulbright lecturer in Egypt, David C. Rife was provided with an opportunity to collect hand prints, ABO blood group data, taste reaction, handedness and kodachrome photographs of 500 Sudanese. An analysis of these data showed the northern and southern Sudanese to be ethnically different from each other and the people of neighboring countries.

QUANTITATIVE GENETICS

Mouse. Inbred strains of mice differ with respect to a large number of characters and conditions, many of which depend upon a large number of pairs of genes. At present the quantative genetics of skeletal variations (number of thoracic and lumbar vertebrae) is being investigated by Earl L. Green. These studies involve crosses and backcrosses between selected inbred lines and hybrid progenies which differ in skeletal type. In a similar way, differences in weight of seminal vesicles and in time of vaginal canalization are being investigated by Chai H. Yoon, and differences in nutritive requirements are being searched for and will be studied by Merton S. Honeyman.

Cattle. The accuracy of the pedigree program of the American Jersey Cattle Club for predicting future performance of calves is under investigation by William J. Brakel.

For the past fifteen years, this program has been used in the evaluation of unproven Jersey sires. The prediction of a sire's transmitting ability for production and body conformation is based on information contained in the first and second generations of his pedigree. This investigation also includes the use of a selection index in an attempt to improve the accuracy of the progeny performance prediction.

TWIN RESEARCH

The use of twins to study the heritability and inheritance of traits is being used in both humans and cattle by David C. Rife, Lester C. Gilmore and Nathan L. Fechheimer. Both areas present similar difficulties of size, long reproductive cycles and low prolificacy of the subject, as well as the practical impossibilities of assembling large numbers under a highly controlled experimental regime. The use of twins can give valid answers with fewer experimental subjects. Fraternal human twins are used to detect simple modes of inheritance comparing degrees of concordance.

Identical twins in cattle and humans are being used to study the heritability of thyroid function and growth potentials. Other studies indicate that some cattle utilize their ration for growth and development function more efficiently than others.

More definite conclusions on the qualitative and quantitative aspects of secondary sex traits are being obtained through the use of cattle twins. Experimental animals include genetic females with both natural and substitutional androgen sources, genetic females and genetic males with castrates compared to normal mates.

John Kinzer, David C. Rife and graduate students have initiated an inquiry into the degree of both intra- and inter-pair differences within identical human twins with respect to discrimination to pitch of sound Results on the first 50 pairs show significantly more intra-pair than inter-pair similarity, thus suggesting an hereditary basis for variation in this trait.

CROP BREEDING

Exploratory genetical research work has been conducted with many diverse types of plants. The value of this work is not always immediately measurable in dollars and cents but through plant breeding programs some contributions of genetic research may be exemplified.

CORN. The Ohio Agricultural Experiment Station in cooperation with other state and federal agencies has been engaged in inbreeding and outbreeding corn since the early nineteen twenties. At the present time more than 99 per cent of Ohio's corn acreage is planted with hybrids. Their average annual value to the state is at least 30 million dollars above what would be expected from the old nonhybrid varieties. The corn breeding program is under the direction of Glen H. Stringfield. In addition to the development of improved varieties, current research work is being conducted on topics such as cytoplasmic male sterility, classification of inbred lines, as well as the effects of defoliation and of row spacings.

SOYBEANS. The rapid development of superior adopted varieties of soybeans through a breeding program directed by Lewis C. Saboe resulted in a high cash value crop for Ohio farmers. Soybeans are now a major grain crop in Ohio where prior to the availability of these adopted varieties, the crop was of only limited use.

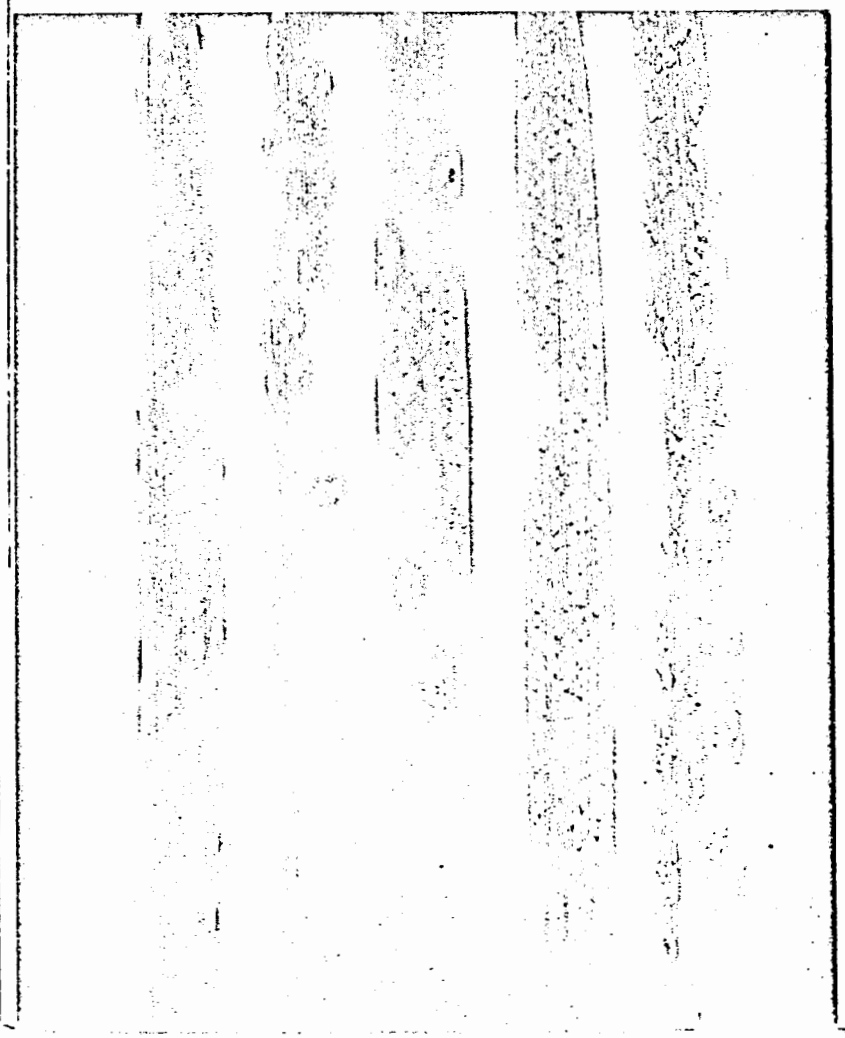
WHEAT. The wheat breeding program has been a major project of the Ohio Agricultural Experiment Station since it was established in 1882. The first crosses in the Ohio program were made in 1915. Three superior soft

Here are shown albino human twins being tested for blood types and sensitivity to heat. Inheritance in man is a major concern of the Institute.

red winter wheat varieties resulting from the breeding program have increased Ohio's wheat crop by at least 25 per cent. These varieties are also grown extensively in other soft red winter wheat growing areas. Cecil A. Lamb is project leader for the wheat breeding program and is currently conducting research work in breeding for improved quality, response to fertilizers and other studies in conjunction with the variety improvement program.

OATS AND BARLEY. Of all the significant contributions of genetics through plant breeding, one of the outstanding examples is that of disease control through breeding of resistant varieties. The oat and barley breeding programs in Ohio under the direction of Verne C. Finkner may serve as an example. Highly destructive plant diseases such as crown rust of oats (illustrated below) cannot be controlled by any means now known other

Oat leaves having varying degrees of resistance (first three leaves from left) and susceptibility (fourth and fifth leaves) to crown rust. Selection of plants with disease resistance has made substantial contributions to our standard of living.



than by resistant varieties. By their use such diseases are controlled economically and effectively on millions of acres. The problem of maintaining resistant varieties, however, is never-ending since the diseases also have the genetic capacity to change. What crop or variety of crops are produced in the future depends upon the research work that has been done in the past or that which is done today. The mode of inheritance and the nature of disease resistance and susceptibility are research projects being conducted simultaneously with the oat and barley variety improvement program.

Horticultural Crop Breeding. Possible progress in horticultural plant improvement is unlimited, for new developments in fundamental genetics are continually offering new solutions to practical problems of plant breeding. Vegetable breeding projects at The Ohio State University under the direction of Walter N. Brown are developing and utilizing these new solutions. Utilization of the phenomenon of hybrid vigor has proven practical in sweet corn and opens new potentials for the future in many other crops. At the present time F_1 hybrids are being used to a limited extent with tomatoes, onions, cucumbers, cabbage, summer squash, cantaloupe, carrot and eggplant. Certain technical problems in the methods of producing hybrid seed preclude wider usage of these hybrids. With tomatoes, for example, the cost of producing seed is expensive because of the amount of hand labor required. One ounce of seed of a standard variety costs about 55 cents to produce, while hybrid seed costs $35 to $40 an ounce. Geneticists and plant breeders, however, have worked out the mechanisms of several types of male sterility such as the functional types of sterility, semisterility and long-styled lines. The phenomenon of self incompatibility and cross compatibility might be used to eliminate the need for emasculation, thereby reducing the high cost of hybrid seed production.

Tomato. Under the direction of Leonard J. Alexander, a breeding program for disease resistance in tomatoes is in progress at the Ohio Agricultural Experiment Station. The work is divided into breeding for Fusarium wilt resistance, tobacco mosaic resistance, leaf mold resistance, and screening of the wild accessions for resistance to 14 diseases of tomatoes. In addition, the thousand tomato accessions introduced in the United States in the past 15 years are being classified for species and type and for horticultural characters. This stock has been multiplied and placed in storage at the North Central Regional Primary Plant Introduction Station at Ames, Iowa.

In 1952, 144 accessions of the wild species were screened for resistance to 15 diseases. In most instances some accessions were either immune or segregated for resistance. Thus it appears that there is a large reservoir of germ plasm carrying disease resistance. Much research remains to be done in this area.

Greenhouse Vegetables. The greenhouse vegetable industry is Ohio's newest and likewise most intensive branch of agriculture. The crops chiefly

raised in vegetable greenhouses are tomatoes, leaf lettuce and cucumbers, with a few others of minor importance. The horticultural department of the Ohio Agricultural Experiment Station started working on greenhouse research in 1927 and Ira C. Hoffman is presently in charge of the program. From this program Tipburn Resistant Grand Rapids leaf lettuce was developed and several varieties of tomatoes such as Association Globe, Marhio and Globe strain A. Present research work is being conducted on hybrid tomatoes and cucumbers.

LIVESTOCK AND POULTRY BREEDING

Research workers in both livestock and poultry recognize the need for progress in low and high energy traits. Studies are under way in gene action and interaction with other genes and with that portion of the variance assessable to environmental influence.

CATTLE. A project to determine the effect of sex hormones on the qualitative response of qualitative traits (sex-influenced traits) and on the response of quantitative traits (secondary sex traits) is under way by Charles S. Baldwin, Nathan S. Fechheimer, Carl F. Rothe and Lester O. Gilmore. The effect of male hormones on the female and male genotype and the effect of the female hormones on the female genotype are being investigated on identical twins, using both castration and substitution techniques.

In addition to secondary sex traits, the sex-influenced trait of mahogany hairs in cattle has been investigated. It is possible to distinguish *mahogany* hairs microscopically and to show that this trait modifies *blackish*. No calf shows mahogany at birth but the frequency in both Jersey and Aryshires increases with age during the first two years. The frequency of the gene for mahogany has been worked out.

A program of testing various lines of beef cattle developed at other institutions is now under the supervision of Earle W. Klosterman. This project involves breeding the sires procurred from the various sources to females from a uniformly appearing herd. An evaluation will be made on the basis of the progeny performance.

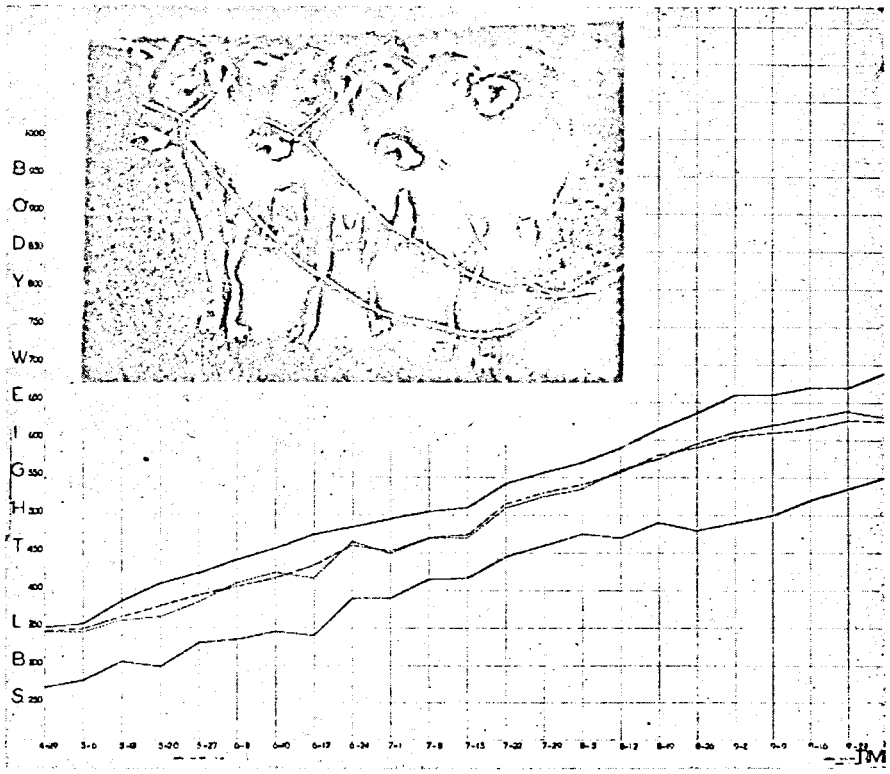
An extensive project involving several thousand cattle to estimate the effectiveness of the reciprocal mating of lines headed by closely related bulls is under way. This federally supported project is supervised by Thomas M. Ludwick and graduate students, in cooperation with the Ohio Department of Public Welfare and the Bureau of Dairy Industry. The main objective is to study the factors affecting the predictability of sires for transmitting the level of milk production. At the same time certain anatomical traits and udder developments are being studied. This project is part of the federally sponsored project of the North-Central region.

To assist the artificial breeding program, research on frozen semen is being conducted by Thomas M. Ludwick and graduate students.

SWINE improvement is being investigated by Wayne L. Robinson and Howard S. Teague. Mating systems are being developed to test the relative combining abilities of various breeds through crossing. Desirability is measured by prolificacy, rate and efficiency of gain, type and carcass quality. The objective is to get as much lean in the various meat cuts as possible.

SHEEP investigated by Donald S. Bell have resulted in the development of lines showing different prolificacy and lamb mortality. The possibility of combining high lactating ability to sustain high prolificacy is indicated.

POULTRY. Comparisons of the effects of different mating systems upon meat and egg production are being analyzed by John F. Grimes, Theo H. Coleman and R. George Jaap. Mating systems under test include individual and family selection within closed populations, crosses between non-inbred strains, crosses between populations having a coefficient of inbreeding



Triplet calves shown above were used in research concerning growth rates. Center lines on the graph indicate how closely the identical twin freemartins (left) follow the same growth pattern. The top line shows the growth rate of the triplet male (right). The bottom line shows growth of a normal female control animal (not pictured).

of more than 50 per cent, and inbreeding together with recurrent selection against a closed-population tester strain.

These researches are integrated with those of the United States Regional Poultry Breeding Project. R. George Jaap is chairman of the technical committee for this project, which includes the twelve North-Central Agricultural Experiment Stations.

A modified diallele design is being used to measure genotypic differences in growth rate by R. George Jaap and Alan F. Gristwood, the latter a graduate fellow from the Scottish Department of Agriculture.

The genetic and environmental causes for variation in the development of the Bursa of Fabricus are under observation by Bruce Glick. The function of this "cloacal thymus," the lymphatic structure which hypertrophies during early growth and atrophies prior to the onset of puberty, is not understood.

THE GENETICS MUSEUM

Both fundamental principles and practical applications of genetics will be illustrated in the genetics museum which is now being established. The museum is intended to serve as a medium of education and to increase the understanding of, and interest in, genetics.

Mechanical models depicting the genetic basis of sex determination, tasting ability and blood groups of humans are among the first displays to be completed. An exhibit to demonstrate the development and advantages of hybrid corn is being built. Other exhibits which are being planned will concern: 1) blood-type variation in man and animals with illustrations of its application in parentage exclusion and in the establishment of relationships between races and subpopulations, and 2) the utilization of hybrid vigor in increasing the productivity of farm livestock.

The museum is being financed by contributions from The Ohio State University Development Fund, the Ohio Hybrid Seed Corn Producers Association and other organizations interested in extending the understanding of genetics. The work is directed by Lewis C. Saboe, William J. Brakel, Elsie Helsel and Nancy Ziebur.

SUPPORT FOR RESEARCH

Although research is an investment rather than a cost when considered in terms of industry, the definite financial limitations to most research programs at educational institutions may be considered as cost items since their applied benefits are usually derived by individuals and organizations other than by those conducting the research. This is true for the more classical or theoretical phases of research no less than for the applied phases. Research conducted through the Institute of Genetics is supported by The Ohio University Development Fund, the Research Foundation of The Ohio State University, the Ohio Agricultural Experiment Station and by grants from

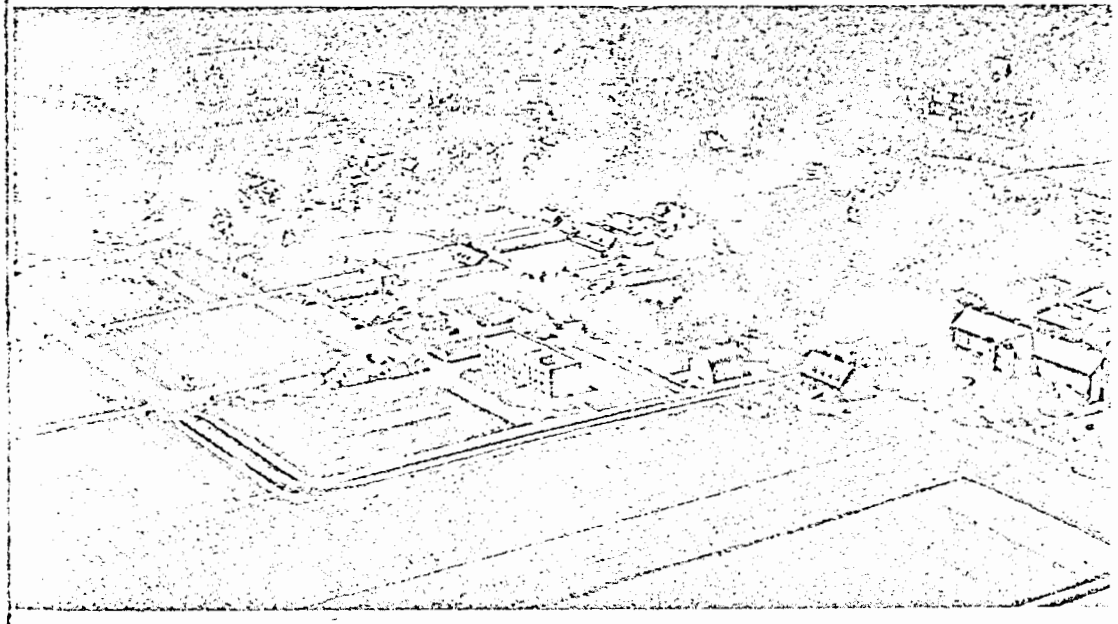
individuals and organizations, including the National Institute of Health, the Central Ohio Breeders Association, the United States Public Health Service and the Ohio Hybrid Seed Corn Improvement Association.

The Development Fund is administered through the University on a noncost basis to the research projects involved. The University defrays the expense of administering the funds; thus the entire donation is made available for research. Projects within the scope of the Institute of Genetics supported through such grants include studies on the cellular antigens in cattle, cattle twin research, heritability of protein-bound-iodine in humans and cattle, the historical aspects of Mendelism and investigations of chimeras.

The breed registry associations for cattle have been supporting the cellular antigen research with annual contributions. The historical features of Mendelism are being centered in various collections and displays to stimulate further thinking along genetic lines. This project has been supported by the Ohio Hybrid Seed Corn Improvement Association. The Research Foundation is an organization for receiving grants from governmental and private sources. The Institute of Genetics projects so supported include studies on the development genetics of the mouse and *Drosophila*.

The Ohio Agricultural Experiment Station receives funds from state and federal sources through regular appropriations, and from private sources through grants-in-aid for specified projects. Research within the administrative structure of the Experiment Station is conducted on a project basis with written and oral reports of progress rendered annually on projects dealing with all phases of agriculture.

THE OHIO AGRICULTURAL EXPERIMENT STATION



INDEX

(Adopted 12/7/51)

THE INSTITUTE OF GENETICS

The Ohio State University
Columbus 10, Ohio

The Institute of Genetics was established in May, 1950, by the University Administration on recommendation of the Graduate Council. The Institute is an interdepartmental organization under the supervision of and responsible to the Dean of the Graduate School. The purposes in establishing the Institute of Genetics are to recognize the widespread interest in genetics, to promote activities in genetics at the University and at the Ohio Agricultural Experiment Station, and to encourage the association of staff members and students concerned with this field of science.

CONSTITUTION

Article 1. NAME. This organization shall be known as THE INSTITUTE OF GENETICS OF THE OHIO STATE UNIVERSITY.

Article 2. FUNCTIONS AND PURPOSES. The functions of the Institute shall be:

1. To foster and encourage interest and work in genetics in the State of Ohio.

2. To develop and coordinate research projects in the various phases of genetics at the Ohio State University and the Ohio Agricultural Experiment Station.

3. To act in an advisory capacity in securing and allocating funds for research projects.

4. To assist in the planning of instructional programs in genetics and closely related fields in the Departments and Colleges of the University.

Article 3. MEMBERSHIP.

1. Membership in the Institute shall consist of Active Members and Associate Members.

2. Active Members shall be members of the faculty of The Ohio State University or members of the staff of The Ohio Agricultural Experiment Station engaged in teaching or research in genetics or closely related fields, with the rank of Instructor or above.

3. Associate Membership shall be open to persons who are interested in genetics, but not eligible for Active Membership.

4. All members may take part in meetings of the Institute, but Active Members only may vote or hold office.

Article 4. EXECUTIVE COMMITTEE AND OFFICERS.

1. The governing body of the Institute shall be an Executive Committee of six members. Two members shall be elected each year for a three-year term. Committee membership shall be so selected that at least three different fields will be represented by at least one member in each. No one committee member shall be construed as representing more than one field. The fields may be, for example, pure genetics, plant breeding, animal breeding, human heredity, etc.

2. Duties of the Executive Committee shall be:

   (a) To elect from among the committee members a chairman, a vice-chairman, and a secretary of the Institute.

   (b) To make decisions of policy for implementing the activities of the Institute.

   (c) To elect new Active Members and Associate Members of the Institute, and to review and revise the membership list annually.

3. The duties of the Chairman of the Institute shall be:

   (a) To call and preside at all meetings of the Executive Committee and all meetings of the Institute.

   (b) To appoint all committees.

   (c) To report to the Graduate Council on the conduct of the affairs of the Institute. Such a report shall be made annually, and at any other times deemed desirable or necessary.

4. The duties of the Vice-Chairman of the Institute shall be:

   (a) In the absence of the Chairman, to perform all his duties.

   (b) To assist the Chairman in the management of the affairs of the Institute.

5. The duties of the Secretary of the Institute shall be:

   (a) To make and keep records of all proceedings of the Executive Committee and of the Institute.

Article 5. MEETINGS.

1. An annual meeting of the Institute shall be held in November of each year. At this meeting the Chairman of the Institute will give an annual report on the activities for the year.

2. Chairmen of committees will report upon the request of the chairman of The Institute.

3. Meetings of the membership may be called at any time by the Executive Committee.

4. A quorum at any meeting shall consist of at least one-fifth of the active membership.

Article 6. ELECTIONS.

1. Elections shall be held annually by mail ballot following the annual meeting. Newly elected members of the Executive Committee shall assume their duties on the January 1 following their election.

Article 7. AMENDMENTS.

1. Amendments of this constitution shall require both (1) a favorable majority of the Executive Committee, and (2) a two-thirds favorable majority of the active membership present at any duly announced meeting of the Institute.

Article 8. BYLAWS.

1. Rules of conduct in the affairs of the Institute under this constitution shall be provided in the bylaws. New bylaws may be added and existing bylaws deleted or amended on approval of a majority of the Executive Committee.

Bylaws of the Institute of Genetics of The Ohio State University

1. Each year, at least one week before the Annual Meeting of the Institute, the Chairman shall appoint a Nominating Committee. This committee shall nominate at least two candidates for each vacancy on the Executive Committee, having due regard for the restriction in Article 4, Section 1.

2. The slate of candidates presented by the nominating committee shall be announced at the Annual Meeting. Additional nominations may be made from the floor.

3. Elections shall be by mail ballot, prepared by the secretary and sent to all active members not more than 5 days after the Annual Meeting. Ten days shall be allowed after mailing out the ballots before the count is made.

4. Immediately following the count of the ballots the secretary shall notify the winning candidates by letter.

5. A meeting of the Executive Committee shall be held as soon as convenient after January 1 of each year, but not later than January 20. At this meeting the Committee shall elect officers for the current year.

Revision adopted 11-2-56

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Columbus 10, Ohio

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3. Associate Membership shall be open to other persons, including graduate students, who are interested in genetics, but not eligible for Active Membership. Applications for Associate Membership shall be submitted to the Executive Committee.

4. All members may take part in meetings of the Institute, but Active Members only may vote or hold office.

Article 4. EXECUTIVE COMMITTEE AND OFFICERS.

1. The governing body of the Institute shall be an Executive Committee of six members. Two members shall be elected each year for a three-year term. The slate of nominees shall be selected so as to achieve diversity of fields and departments. If for any reason an Executive Committee member is unable to fulfill his term, a successor for the remainder of the term shall be promptly chosen by the Nominating Committee, with due regard to the diversity of representation in which said vacancy exists.

2. Duties of the Executive Committee shall be:

   (a) To elect from among the committee members a chairman, a vice-chairman, and a secretary of the Institute.

   (b) To make decisions of policy for implementing the activities of the Institute.

   (c) To recommend new Active Members, and to review and recommend the revision of the membership list annually. The recommendations shall be made to the Dean of the Graduate School for his action. To receive, consider, and act upon applications for Associate Membership.

3. The duties of the Chairman of the Institute shall be:

   (a) To call and preside at all meetings of the Executive Committee and all meetings of the Institute.

   (b) To appoint all committees, subject to the approval of the Executive Committee.

   (c) To report to the Graduate Council on the conduct of the affairs of the Institute. Such a report shall be made annually, and at any other times deemed desirable or necessary.

4. The duties of the Vice-Chairman of the Institute shall be:

   (a) In the absence of the Chairman, to perform all his duties.

   (b) To assist the Chairman in the management of the affairs of the Institute.

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2. Chairmen of committees will report upon the request of the chairman of The Institute.

3. Meetings of the membership may be called at any time by the Executive Committee.

4. A quorum at any meeting shall consist of at least one-fifth of the active membership.

Article 6. ELECTIONS.

1. Elections for the Executive Committee shall be held annually by mail ballot following the annual meeting, as prescribed in Article 4, Section 1. The election of the chairman, vice-chairman, and secretary shall be as prescribed in Article 4, Section 2 (a).

Article 7. AMENDMENTS.

1. Amendments of this constitution shall require both (1) a favorable majority of the Executive Committee, and (2) a two-thirds favorable majority of the active membership present at any duly announced meeting of the Institute.

Article 8. BYLAWS.

1. Rules of conduct in the affairs of The Institute under this constitution shall be provided in the bylaws. New bylaws may be added and existing bylaws deleted or amended on approval of a simple majority of the membership at a duly announced meeting.

Revision adopted 12-7-56

THE INSTITUTE OF GENETICS

The Ohio State University
Columbus 10, Ohio

By-laws

1. A meeting of the Executive Committee shall be held as soon as convenient after January 1 of each year, but not later than January 20. At this meeting the Committee shall elect officers for the current year.

2. At a second meeting of the Executive Committee, to be held not later than February 20, the Chairman shall present for approval membership for the following standing committees: Constitution Committee, Curriculum Committee, Educational Exhibits Committee, Nominating Committee, Program Committee, Publication Committee, Research Committee. At the suggestion of the Chairman, subject to the approval of the Executive Committee, and with due notice, special committees may be appointed. The [illegible] Chairman will [illegible] at the beginning of the following spring quarter.

3. The Nominating Committee shall nominate at least two candidates for each vacancy on the Executive Committee, having due regard for the restriction in Article 4, Section 1. Should a vacancy exist for any reason other than normal expiration of term, the Nominating Committee shall appoint a new member to the Executive Committee.

4. The slate of candidates presented by the Nominating Committee shall be announced at the Annual Meeting. Additional nominations may be made from the floor.

5. Elections shall be by mail ballot, prepared by the secretary and sent to all active members not more than 5 days after the Annual Meeting. Ten days shall be allowed after mailing out the ballots before the count is made.

6. The Nominating Committee shall have the additional function of counting the ballots and notifying the secretary, who shall then notify the winning candidates by letter.

7. In event of a tie vote between persons running for the Executive Committee, the tie shall be broken by a vote of the membership at a duly announced meeting. In the event of different terms being involved by the two tieing votes, the person serving the largest-term on the Executive Committee shall be the one receiving the shorter new term.

having served the longest.

Sheep Breeding

A large population of sheep, located at Wooster, Ohio, is involved in a cooperative study with the University of Illinois and North Dakota State University. The objectives of this investigation are to define the heritable traits of economic importance in lamb meat production. Heritability and genetic and phenotypic correlations will be calculated from data collected on 24 different sire groups each year. Selection indexes will be constructed for application in the sheep industry.

The three breeds involved in the study are Columbia, Suffolk, and Targhee. Two breeds are maintained at each station and replicated at the other stations so genetic-environmental interactions can be investigated according to breed and strain differences. Two- and three-breed crosses are planned to establish the importance of mating systems for lamb meat production. Detailed carcass data are obtained on slaughter lambs.

Crossbred and straightbred animals of the Dorset, Rambouillet, and Targhee breeds are produced to study combining ability and systems of mating for lambs raised under extensive and intensive systems of management. Special emphasis is given to the importance of inheritance for developing sheep capable of twice-a-year lambing. Rambouillet and Rambouillet crossbreds have been exchanged with the Texas station to study breeding and location effects on reproductive performance.

A completely computerized production testing program, with records available on purebred and commrecial flocks in Ohio and many other states, provides additional data for studies in sheep breeding.

Swine Breeding

A within-breed selection experiment using 60 Hampshire and 60 Yorkshire females is underway. The primary basis for selection is the ultrasonic prediction of leanness on live animals. Each breed is divided into four lines with the selection criteria being lean growth rate, lean cut percentage, gross growth rate, and random control. The direct genetic response to selection for leanness and the indirect genetic responses of other economic traits such as feed use, reproductive ability, soundness, and carcass characteristics will be measured. Studies of the genetic relationships of physiological and biochemical traits with the production traits of swine are planned.

A herd of 40 females is maintained on a two-breed, rotational crossbreeding system. The progeny are used for short-term experimental work.

The Swine Evaluation Station and Herd Improvement Program of the Ohio Pork Improvement Association provide data for studies on genetic and environmental parameters of live and carcass traits. The station has been in operation since 1954.

Dairy Cattle Breeding

Research opportunities for the study of the dynamics of dairy cattle populations are readily available. Monthly and lactational records are collected routinely from herds in Ohio and Indiana participating in the Dairy Herd Improvement (DHIA) Program. These records are available for investigating improvements needed in dairy sire evaluation methods. Studies of the selection practiced in dairy cattle populations and new techniques for improving the efficiency of selection methods toward maximum genetic progress are underway.

A long-range dairy cattle breeding project to study the potential of specific combining ability has been underway since 1952. This project is conducted with the cooperation of seven state-owned institutional herds comprised of approximately 800 milking cows. Data collected from these herds provide numerous opportunities for research investigations. Routinely collected data include body weights at four